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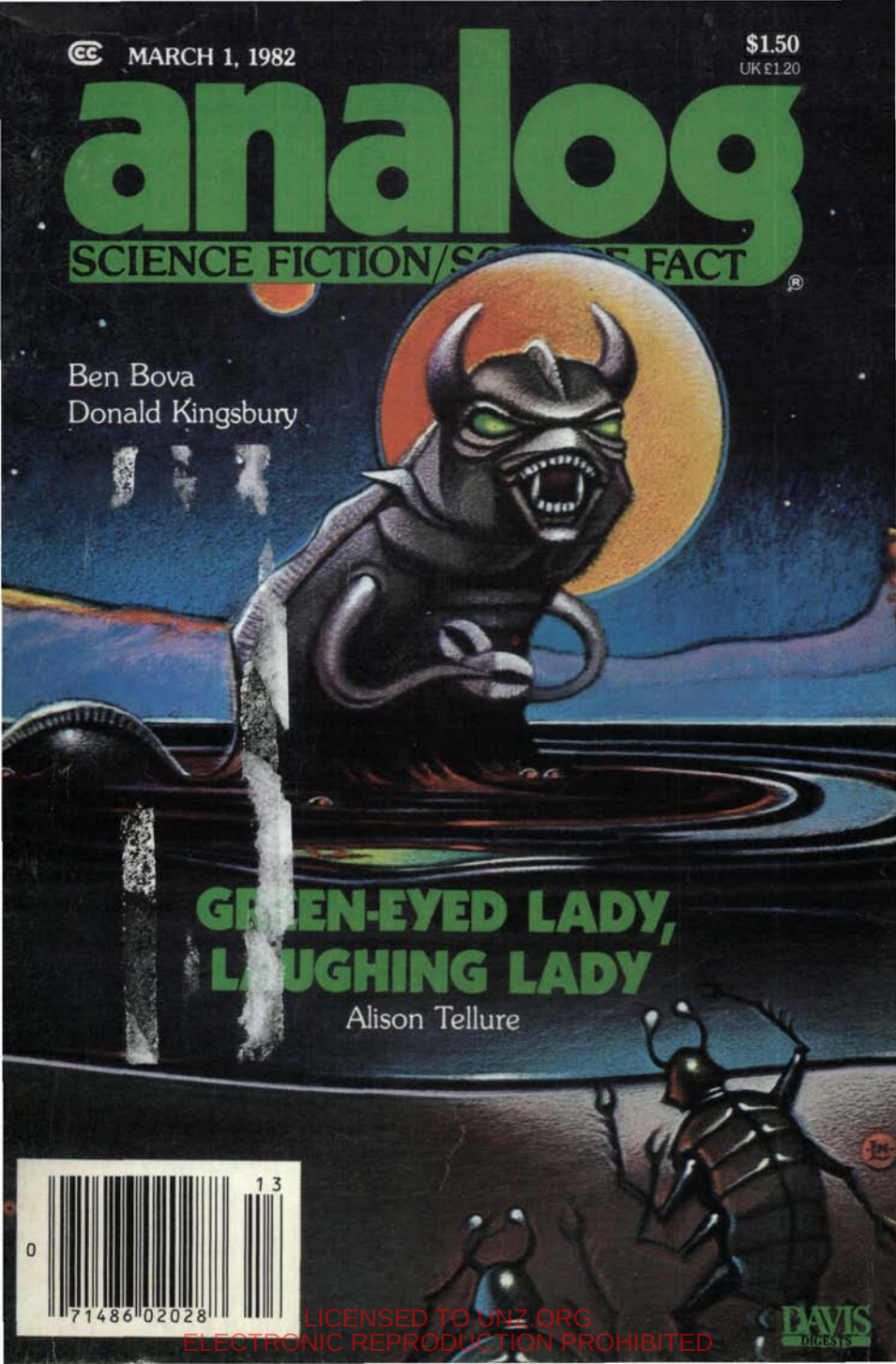

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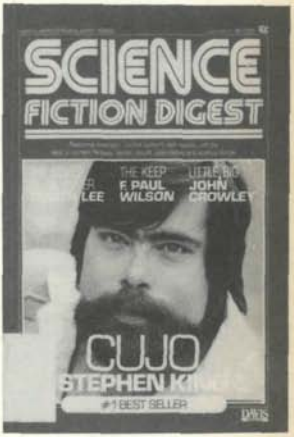

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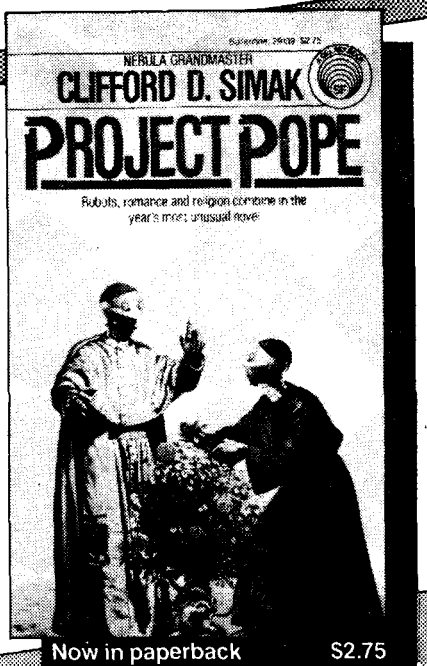

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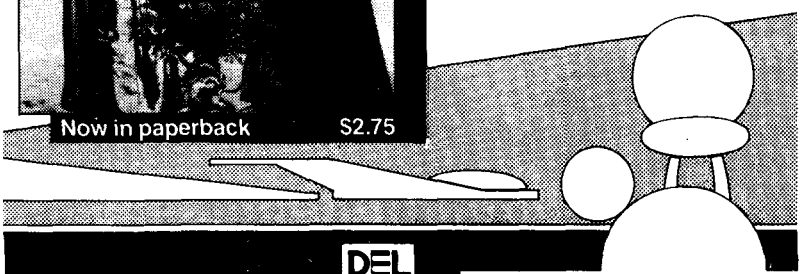

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BUILDING A REAL WORLD

(This guest editorial, by Analog*'s former editor, was originally presented as the Guest-of-Honor speech at PhilCon '80. For more on these matters, see his new book,* The High Road.)

My text today is from the Gospel according to St. Matthew, Chapter 5, Verse 13: Ye are the salt of the earth; but if the salt has lost his savor, wherewith shall it be salted?

We all love this thing we call science fiction. No two of us agree as to just what, exactly, science fiction is—but whatever it is, we agree that we love it.

Perhaps too much. After all, there is a big, brawling world out there that desperately needs men and women of vision, and vigor, and courage. Yet it is awfully tempting to remain here in our snug little world of science fiction and hope that the outside world leaves us alone.

When I first came into science fiction, writers and fans alike bemoaned the fact that we were in a literary ghetto. Science fiction was ignored by the general reading public, despised by the critics, and treated by the publishers as something between a narcotics addiction and a social disease.

Through the decades of the 1960s and 1970s, many writers struggled to break down the old ghetto walls. So did a few fans. Gradually, brick by stubborn brick, the walls did come down.

An enormous part of that success was due to two men whom we seldom think of as science-fiction writers: Gene Roddenberry and George Lucas. *Star Trek* created a huge audience for science fiction among people who had never read a science-fiction story in their lives. *Star Wars* cashed in on that audience—and made it even bigger.

Shallow as *Star Wars* was, as science fiction, it was a profound message to the men who make the money decisions in New York and Hollywood. The old ghetto walls were finally levelled by outsiders who came to us searching for gold.

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Much of what those outsiders have created is unpalatable to the majority of us who have spent our lives in science fiction.

Frankly, I am appalled to see motion picture producers sinking 20, 30, 40 million dollars into tripe such as *Close Encounters of the Third Kind,* or *Alien*. The motion-picture version of *Star Trek* was not as good as the average segment of the TV series, despite the money and talent that was lavished on it. And Disney's *Black Hole* was an exercise in frustration for all concerned, especially the audience.

In the world of the printed word, we have seen the mainstream picking up a number of science-fiction ideas and themes, and using them in mainstream novels that have little to do with science fiction.

Try reading a Robert Ludlum novel, or any of a dozen books that have been on the best-seller lists this year, such as *The Third World War*. The scenarios, the plot techniques, the trick of presenting future events as past history, all these have been lifted bodily from science fiction.

Most of these books would not have been published at all five or ten years ago, because the publishers would have considered them too "far out." Or, if they were published, they would have been labelled Science Fiction and sold to us in the ghetto, while the multi-million-dollar mainstream market totally ignored them.

The only thing that the mainstream has not lifted from science fiction has been the science-fiction writers. With the exception of Frank Herbert's Dune novels and Robert Heinlein's newest work, no science-fiction writer has ever received the backing from a publisher that is necessary to reach the exalted level of Best-Sellerdom.

Of course, Heinlein's *Stranger in a Strange Land* has sold millions of copies. So have several other science-fiction novels. But only over a period of many years. Movie tie-ins sell fast and furiously, but it is difficult to rank them as science-fiction novels.

On the magazine front, there is good news and bad news.

The good news, I say unabashedly, is *Omni*. For some strange reason, I'm rather partial to that magazine.

Omni is selling close to one million copies per month. It has more than 200,000 paid subscriptions. Readership surveys by independent organizations such as Yankelovich, Skelley, and White report that *Omni* has more than five million readers each month.

In short, *Omni* is doing quite well, despite the persistent rumors of catastrophe that I hear at science-fiction conventions. Two months after the magazine started, some fans were claiming that it was going to fold up. Two weeks after I became the executive editor, I heard a rumor that I had walked off the job. It's as if some fans *want Omni* to fail, because they cannot stand the idea of a magazine that contains science fiction making a major success out there in the real world.

Less good is the situation with the other science-fiction magazines

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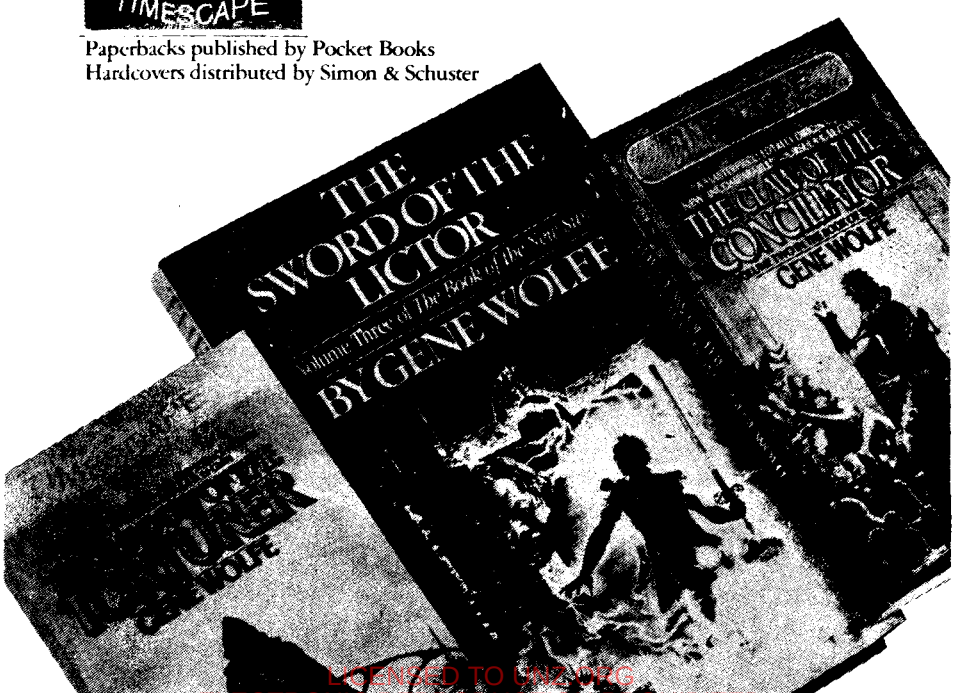

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cause Davis is much more interested in the magazine than Condé Nast ever was, it is a disappointment because it means that one of the most powerful magazine publishers in the nation still cannot see the value of science fiction.

Isaac Asimov's Science Fiction Magazine is doing very well, and George Scithers picked up his second well-earned Hugo in three years at Noreascon II. But frankly, the magazine is aimed at such a juvenile audience that an old-timer like me finds it rather uninteresting most of the time.

The Magazine of Fantasy and Science Fiction seems to be going along its literate way, still the darling of Charlie Brown's readers, but virtually unchanging, year by year. *Galaxy* and *Amazing* have been in deep trouble for years, and *Galileo*—the most interesting of the newcomers—has also run into serious financial problems. (*As of press time,* Galaxy *and* Galileo *have ceased publication.—Ed.)*

If history has taught us anything, it is that magazines must grow or die. Inflation is constantly driving costs upward. If a magazine that depends almost entirely on its cover price is to stay in business, it must either bring in more customers or raise its cover price. No magazine can continue escalating its price indefinitely, so the long-range goal must be to increase circulation.

Yet the science-fiction magazines have been singularly unable to accomplish that task.

I must point out that *Omni*—because it is sold to a much larger readership than the science-fiction audience, and because it is heavy with advertising—does not fall into the same category as the "hard core" science-fiction magazines.

Grow or die. The hard-core science-fiction magazines are not growing. (*We're working on it—and there's evidence that our efforts are paying off.—Ed.*)

Is science fiction itself growing or dying? Most outward signs point toward growth. There are more people attending science-fiction conventions than ever before, and more conventions being held. Noreascon II was a well-managed mob scene, with nearly 6,000 people in attendance. In fact, the WorldCon now ranks among the top annual conventions held within the United States, which explains why the hotel chains treat fandom with some respect.

Most colleges and universities regularly schedule classes in science fiction. And (God help us all) there are now professorships in Science Fiction. No one has been able to count the thousands of high schools and junior highs that hold science-fiction classes.

Yet, how many of these convention attendees and students and—yes, even *Omni* readers—are truly science-fiction fans? Only a small percentage, apparently. The true test of fandom's strength lies in the circulation of the hard-core science-fiction magazines and in the sales of science-fiction paperbacks. Magazine circulation has grown very little, if any, over the past decade. And paperback book sales have dropped so steeply that heads are rolling all through the book publishing industry.

More alarming—to me, at least—is that the mental attitude of fandom has

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They were the greatest fighting fleet in the universe—battling betrayal and revenge, and the terrible fate that awaited them on the edge of the

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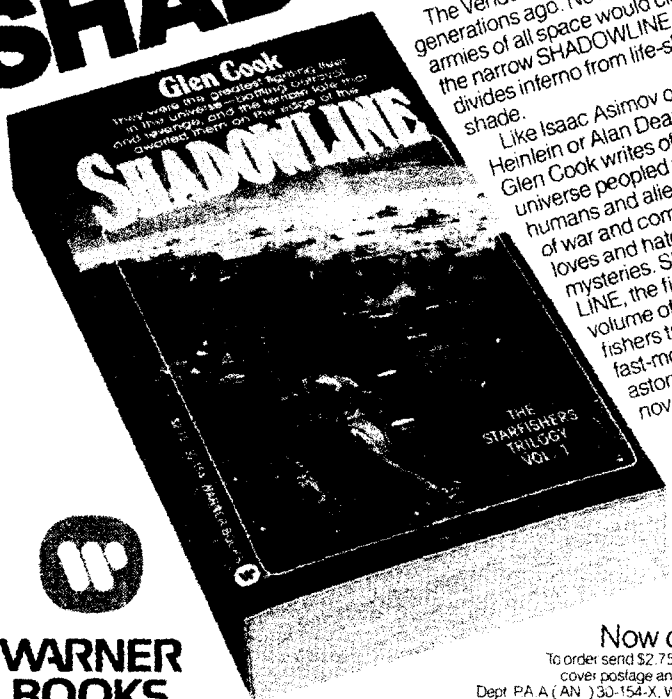

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not seemed to grow much over the past ten years. Or twenty, for that matter.

I attend conventions year after year and see the same people saying the same things to each other. Some of the faces change, from time to time, but the *ideas*, the *mind-set*, remains the same.

You don't think so? Take a look at the most popular science-fiction books of 1980 and compare that list with the best-read books of 1970, or 1960, or even earlier. The same themes, the same characters, with only minor variations.

We pride ourselves on being "the literature of ideas." But too many of us are locked into the past: the future we dream about is a juvenile's dream—a juvenile of 1945, at that.

Instead of stepping into the real world and taking charge of it, as we should be doing, we sit back with still-yet-another version of a Doc Smith epic, or the latest heroic spasms of Conan the Kumquat.

And don't you women snicker at the phallic fantasies of the men. Neither as writers nor as readers have you raised the level of science fiction a notch. Women have written a lot of books about dragons and unicorns, but damned few about future worlds in which adult problems are addressed.

Fandom stays firmly in the vanished remains of the old ghetto, like a tribe that clings to the ruins of an ancient city. We revel over the nonsense spewed by the likes of Dick Geis or Ted White when we should be pondering the ideas of René Dubos or Hans Bethe.

Now, all of this is fine, if that's what you like. I'd be an ungrateful sonofabitch to insist that you *must* take your heads out of those yellowing pages and assume your rightful place in the real world.

The trouble is, you are bright, intelligent, vigorous, capable men and women. The real world needs you, needs your intelligence and dedication, and needs it *now*. There are not many like you. As Cyril Kornbluth pointed out in "The Marching Morons," there are more idiots out there than geniuses. By far.

I can't force you to become active in the world beyond the science fiction ghetto, so I've got to convince you that you should. The place where you are most needed, where you can make the most important contribution, is in the space program.

In the beginning was the Word, and the Word was Arthur C. Clarke's . . . and Robert A. Heinlein's . . . and Willy Ley's . . . and the words of many other writers.

When I first started reading science fiction, "flying to the Moon" was a popular way of saying that something is impossible. "Harry Truman has as much chance of beating Tom Dewey as he has of flying to the Moon." Hearty laugh.

But the poets of that era—the science-fiction writers—dreamed of going to the Moon. Writers such as Ley, and Heinlein, and Clarke showed that it could be done. They convinced the American people that it could be done.

By 1961 we had a President who accepted the challenge and led the American people to the Moon. Some of you may be old enough to remember that in 1961 we were far behind the Russians

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in space efforts. By 1969, a scant eight years later, we had raced ahead so far, so fast, that the Russians pretended they had never been interested in the Moon at all.

And we believed them! Our space technology reached the Moon so easily that many Americans fell for the delusion that it was all a big public-relations stunt.

Even science-fiction writers (some of them) thought that the space program had somehow lost its excitement, its romance, its poetry.

What had happened, of course, was that the poets had been shouldered aside by the engineers. Science-fiction writers had helped to get the program started, but they could not do the actual technical work. I certainly would not want to ride in a rocket engineered by me! Getting to the Moon required engineers and astronauts, administrators and bureaucrats. No poets.

So the science-fiction writers stood on the sidelines and watched. Some refused to watch. Some became antagonistic. Brian Aldiss complained bitterly that American science-fiction writers were "sucking up to NASA" and that this was ruining American science fiction. Barry Malzberg, on hearing that Spiro Agnew was in favor of going on to Mars, castigated the whole space program and everyone in it as tools of repression.

These were idiotic statements, made under the passions of the moment. There is an old Russian story about a fox and a sparrow and a pile of manure that ends with the moral: It's not always your enemies who put you in it, and it isn't always your friends who get you out of it, but if you're in it up to your neck the least you can do is keep your big mouth shut!

Because of the general backlash against space—a punishment, mind you, for being successful—the Nixon Administration was able to slice away at NASA's funding. While Nixon himself smilingly greeted the first astronauts to return

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from the Moon, his White House aides were cutting the throat of the Apollo program. Apollo did not die; it was foully murdered.

If we had used our space capabilities through the decade of the 1970s as we had originally planned, we would today be beaming energy from space to the Earth. We would be preparing to mine the Moon and the asteroids for the megatonnages of natural resources that have been waiting there untouched for four and a half billion years.

Instead, we have allowed our ambitions in space to dwindle to almost nothing. And our national economy, our prestige, our power, our standard of living, our own self-respect, have all dwindled equally over the past decade.

Enemies of the space program say we should not spend so much money on space, as if we take cartloads of greenbacks up in rockets and leave them on the Moon. We do not spend a lot of money on the space program. I know that NASA's budget of $5 billion per year looks huge. But consider the job that needs to be done.

Consider the fact that the Department of Defense spends $5 billion every two weeks. And the Department of Health and Human Services spends that much every nine days. Consider the fact that we, you and I, spend $7.5 billion per year on pizza, $18 billion on cigarettes, $40 billion on booze, and God knows how much on pot.

During the course of the Apollo program we spent $23 billion to reach the Moon. We got in return not merely a few hundred pounds of rocks, but the team and the technology that can take us anywhere in the solar system that we wish to travel. During those same years the Federal Government spent more than $500 billion on programs to help the poor. Who has been helped? There are more poor today than there were when those programs began. And the gap between rich and poor has widened, not narrowed.

Make no mistake about it. We need the energy and the natural resources that exist in space. Today the world's population is almost 4.5 billion. By the end of this century it will be at least 6 or 7 billion. Can you imagine the social turmoil, the political conflicts, the terrorism and wars of a world twice as crowded as we are today? A world with fewer natural resources, less food, less energy?

We must reach out to the wealth that waits in space and bring it safely here to Earth, to make everyone richer. Not a welfare system, where we slice a finite-sized pie of resources into smaller and constantly smaller pieces until everyone starves. That is the politics of scarcity. It leads only to doom.

We have at our fingertips a new bonanza that will give us a hugely larger pie, so that everyone can share in abundance.

And that is why you are needed.

Science-fiction fans can see the future more clearly than politicians and businessmen. It is up to you to convince them that our future lies in space.

"Ye are the light of the world . . . but men do not light a candle and put it under a bushel . . . let your light so shine before men, that they may see your good works . . ."

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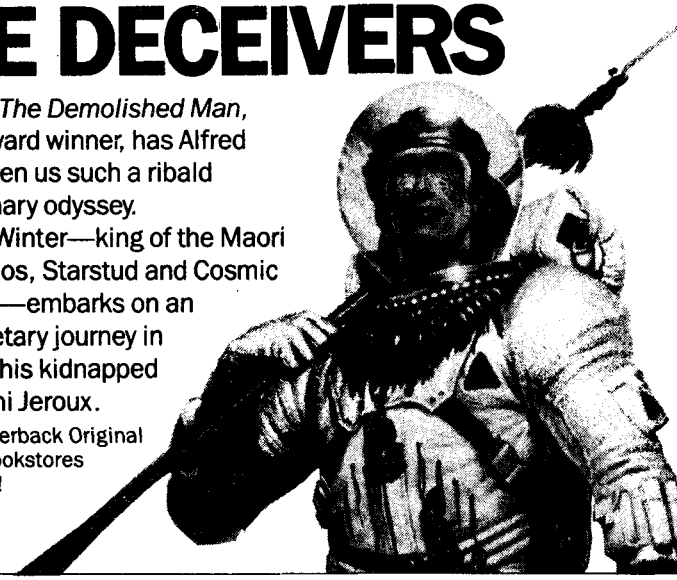

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All around this country, grass-roots organizations are forming to support a stronger, more effective space program. These groups include the National Space Institute, the L-5 Society, the World Space Federation, the Citizens for Space Political Action Committee, the AIAA, the AAS, and many others.

I urge you to join these groups, to use your energy and intelligence—and your experience in organization—to help these grass-roots groups to build a powerful voice in favor of a truly vigorous space program.

And more.

Twenty years ago, the environmental movement was as small and scattered as the space movement is today. Now the environmentalists are a powerful political force. Unfortunately, most environmentalists tend to look at the space program with suspicion, if not outright hostility. This is a tragedy for both sides, because the long-range goal of both sides is exactly the same: we both want a clean, green, safe planet Earth, a homeworld for humankind that is a good place to live on.

We must bridge these gaps of mistrust and misunderstanding between the environmentalists and the space enthusiasts. We must prove to our political and business leaders that either we reach into space or we collapse here on Earth and sink into decay.

You can help.

It is time you lifted your faces from those fantasies of the future and got to work here in the present. We build our future by what we do—or fail to do—today. Now. Here.

The future begins today. Let us build together the kind of future that we all want to live in. And let us start *now*. ■

● How long will it be before there is no quietness anywhere, no escape from the rumble and the crash, the clank and the screech which seem to be the inevitable accompaniment of technology? Whatever man does or produces, noise seems to be an unavoidable by-product. Perhaps he can, as he now tends to believe, do anything. But he cannot do it quietly. Joseph Wood Krutch

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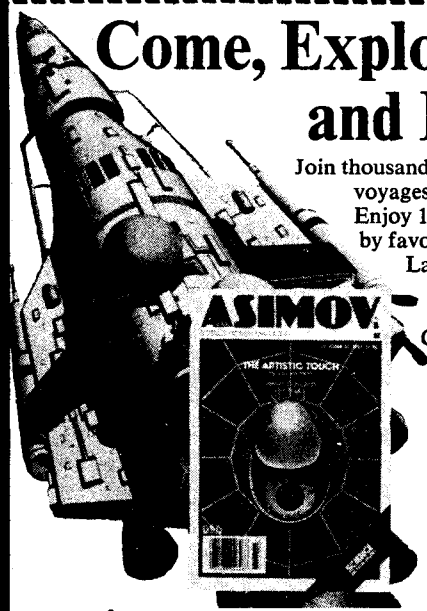

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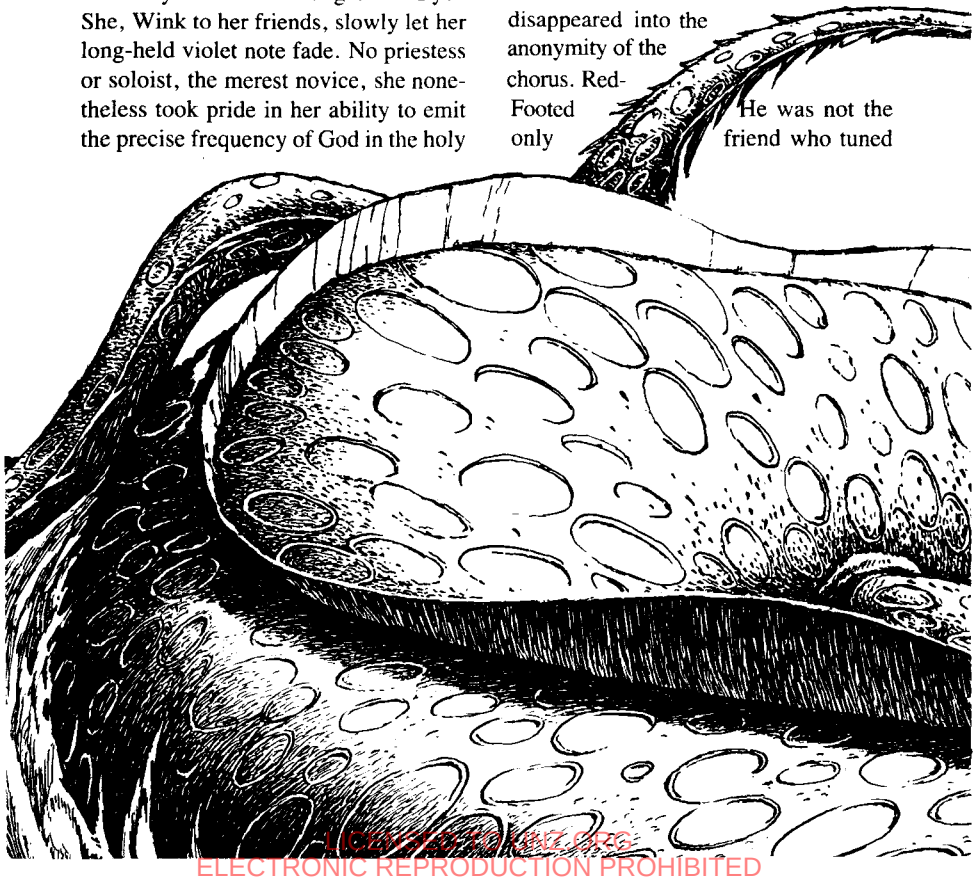
Alison Tellure

GREEN EYED LADY, LAUGHING LADY

Every relationship between two sentient beings is unique. But some are (may my English teachers forgive me) more unique than others....

". . . Thus Yd wills, thus Yd commands, thus let it be."

The hymn ended. Young Green-Eyed She, Wink to her friends, slowly let her long-held violet note fade. No priestess or soloist, the merest novice, she nonetheless took pride in her ability to emit the precise frequency of God in the holy refrain, and to maintain it with never a waver; she found a satisfaction in the skill with which she disappeared into the anonymity of the chorus. Red-Footed He was not the only friend who tuned



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from her spectrum, when Choirmaster wasn't looking.

A sparkling and twinkling erupted in the night, from the shadowed lawn below the City of God—the populace praising the singers, and adding their devout "amens." Wink's eyestalks stretched yearningly toward the Holy Water, peering out over that place, barely discernible in the gathering dusk, where bulked what might have been a small island. But if God had seen the hymn, Yd gave no sign.

Choirmaster dimmed until he radiated only in the infrared, but for a dull, gray-yellow pulse that rippled across his abdomen: a disappointed sigh. He quickly blanked it, and blinked a curt dismissal at his young protégés.

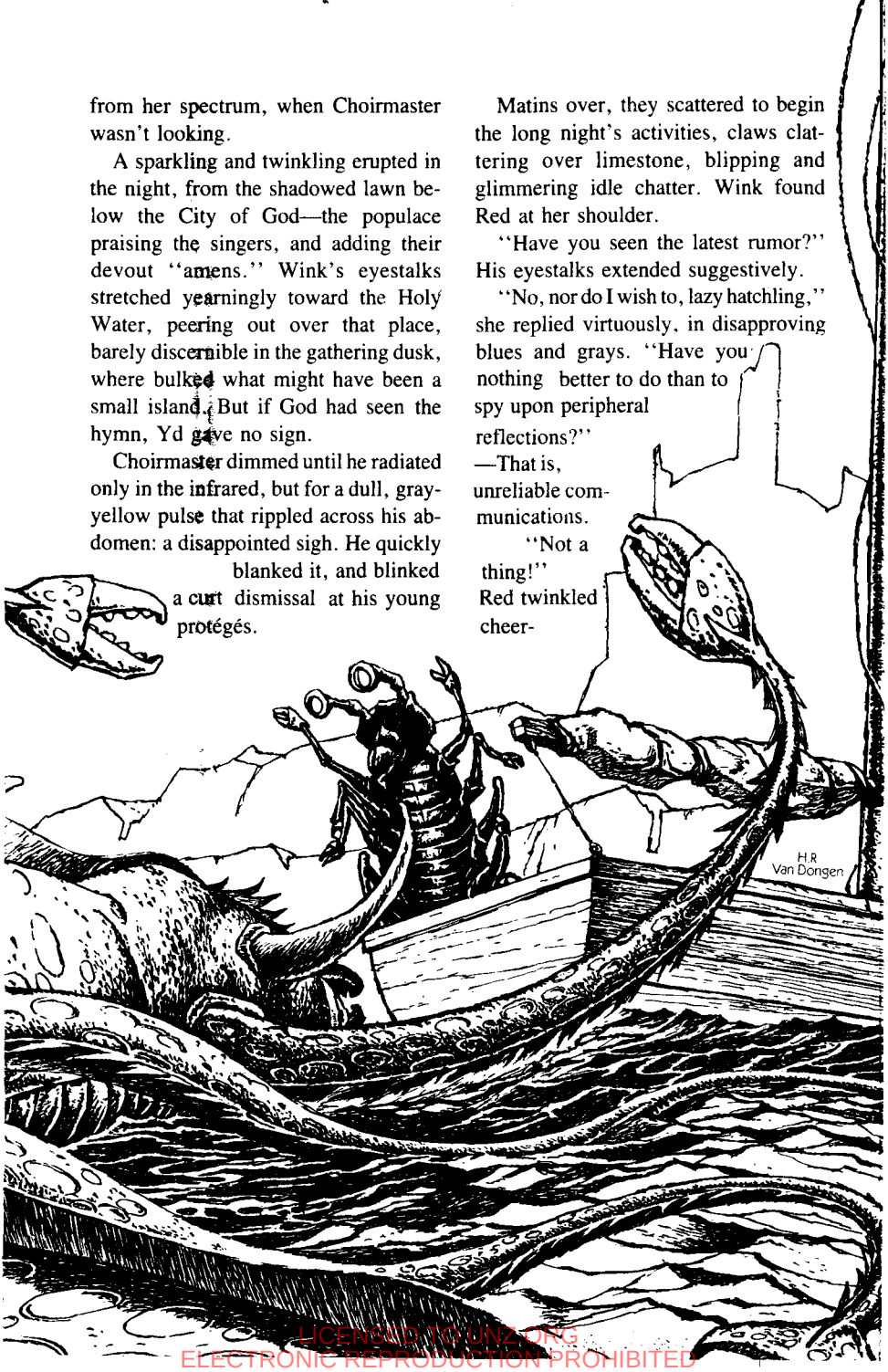
Matins over, they scattered to begin the long night's activities, claws clattering over limestone, blipping and glimmering idle chatter. Wink found Red at her shoulder.

"Have you seen the latest rumor?" His eyestalks extended suggestively.

"No, nor do I wish to, lazy hatchling," she replied virtuously, in disapproving blues and grays. "Have you nothing better to do than to spy upon peripheral reflections?"

—That is, unreliable communications.

"Not a thing!" Red twinkled cheer-



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fully, his habitual good humor unruffled. "Watch: there's to be a shake-up in the Servants' Corps."

She flashed him a disgusted greenish-yellow smudge. "Feh! . . . Always there are such rumors! Your brain must be even smaller than I have always suspected it to be. The rumors grow to brilliance, the novices waste their time jostling one another when they could be studying, and then the rumor fades away into the sensible darkness of nightly life, leaving only frustrations and broken friendships for its beacon. And why any novice ever expects the theoretical vacancies to be filled from *our* ranks, rather than from the Fishers, whom God knows have earned it, is beyond me."

"Well, naturally everyone dreams of avoiding the hazards of Fishing, and wants to skip right up to Servant status. Hope springs eternal in the mortal thorax, however irrational," he admitted in a sheepish sine wave down his middle. "Still, I saw this from a good authority: Sweetscales saw it direct from The Gimp, who happened to glimpse two Elders talking about it."

"Dim your nonsense, naming people!" she sparked tightly. "An Elder may be watching us even now!"

He reduced his intensity but slightly, an indifferent concession. "So? Let him, her, or yd watch. Want to see something else?"

"No."

"Gimp also says—" he began.

She rolled her eyes—a complex gesture, with eyestalks—then shrugged her carapace and laughed, staccato orange and silver rays fountaining outward from her braincase to disappear around behind her.

"Oh well! I can perceive that you won't be happy until you've shown me everything you know about anything, so go on; I have a few moments."

He snapped an impudent claw beneath her jaws, but returned to his gossip with relish. "The Gimp says that this time they really are going to throw out some Servants, maybe as many as seven or eight. And there really is a possibility that they won't replace them with Fishers, at least not all of them. Yd says that God's long absence from our songs and ceremonies has so alarmed the priests and Elders that they are beginning to wonder whether the current Servants have offended Yd in some way, or even whether perhaps the entire system needs a change. There were hints of an experiment. And look, everyone knows that something happens to the Fishers, out there in the wilderness. Only some of them are elevated by the experience, or unchanged. Many return . . . altered, unfit to resume life in the City of God, unfit for anything but Fishing, in fact. So why couldn't that rumored experiment be that the Elders intend to try putting novices in as Servants?"

"Your path of logic crosses deep chasms of wishful thinking, Red," she chuckled. "As for me, I look forward to my tour of duty as a Fisher."

"Yah, even if it makes you a savage?" he challenged, fringing affectionate magenta spiral patterns with jeering yellow filaments.

"What could be more devout and blessed than to spend one's life feeding God?" Wink rejoined, in pious purples and greens.

"To spend it serving Yd in comfort,

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right here in the City of God!''

Wink only laughed, and kept her reservations private.

But, three nights later, it was Wink herself whom a Servant of God stopped, as she creaked down the muddy path to the Lake to make a small votive offering.

''Are you Green-Eyed She?'' flashed the Servant.

''Yes, honored one,'' Wink glimmered, almost invisibly.

''Follow me. And turn up your brights; I am getting old and can no longer see certain frequencies as well as once I could,'' he brusquely ordered, and turned to scuttle up a branching path with a celerity that belied his age.

Wink said, faintly, ''Yes, sir! I mean, YES, SIR!''

''You needn't light up the City, hatchling, I'm not that blind yet! . . . Not yet too blind to talk, not yet so blind as to throw myself into Holy Water for God to eat, no, by God, not yet!'' Wink realized he was glimmering to himself, and wisely kept dark.

For the first time in her life, she found herself inside the great stone temple, that incorporated the original pier built by the Founders in ancient days. The blank, empty thoracic shells of long-ago Supreme Hierophants lined the walls leading to this most holy of sacrificial altars, standing sentinel over the ages. But the elderly Servant ushered her off into a side chamber and through a maze of passageways ending in—Wink gave one swift green blink of surprise, hastily mantled—the High Priest's office.

''This is the she,'' said her guide, who turned and clittered back the way they'd come.

The venerable priest looked her over for some moments in lightlessness, stalks twitching meditatively.

''Well, and you are Green-Eyed She, called, I believe, Wink,'' he began, finally. ''Choirmaster speaks well of you, praising the purity and clarity of your spectrum. He has ventured the opinion that with accelerated training, you could achieve a certain virtuosity in very fine discrimination of wavelengths. —Well, and what have you to say to that?''

''That—that I am honored by the Choirmaster, and hope to earn his words.'' Wink was completely taken aback by this unprecedented interview.

''I also see from your broodfoster Longstalks that you seemed to have a true and early vocation to the Service; and everyone to whom I have spoken assures me that you are not, unlike so many others, in it for the cushy berths that may be had if one survives the risks of Fishing. Eh? Are you a gambler? Do you like to see and reflect rumors about novices skipping up directly into Service? Eh?''

Wink went deep burnt sienna from embarrassment. Obviously someone had observed and reported the conversation with Red. ''No, honored one. I saw such an idea once, true, but paid it no thought. And I certainly didn't reflect it on! I do not seek to avoid my duty as a Fisher. Rather, I conceive it to be an honor. One knows that all Servants of God have truly earned the privileges they enjoy, for they have all been Fishers. If a novice were to become a Servant without having first been a Fisher.

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the respect for the entire Service would soon decline."

The old he chuckled, little silvery sparks shivering over his carapace. "Your words look very much like ones I saw yesternight, in a very long, actinic argument. Well, we shall leave that, for the moment.

"Now I shall put you through your catechism.

"Who is God?"

The sudden switch nearly caught Wink off guard.

"God is Yd Who created world and sky, both the stars that sing and the sun that chastises, and Who fashioned mortals out of the mud and reeds of the shore of Holy Water; eternal, all wise, all powerful, all good."

"What is the purpose of life?"

"To serve God."

"Where do we go when we die?"

"Into the mud and water of Holy Lake, whence we came, for the greater glory of God, who hungers for our sake."

"If God knows no gender as mortals know it, why do we call God Yd?"

"Because Yd nurtures us, Yd's mortal hatchlings."

"Who is the Evil One?"

"The Enemy of all life, who in the beginning of time sent devil slaves against the Favored People of God; but God strengthened them and aided their counsels, and wrestled with the demons, and vanquished the Evil One."

"That's enough. All very correct. Now, what if I were to tell you that all of those things are false, that Yd created neither world nor sky, nor fashioned mortals out of mud or anything else, nor is eternal, all-wise, all-powerful, all-good; and the purpose of life is merely to live and grow and change; and while we do indeed go into Holy Lake to be consumed by God when we die, it is more to ease the burden on the Corps of Fishers than for anyone's glory; and Yd has made only one offspring in Yd's life, and that one died; and though God may once have tricked a few of the Evil One's underlings, Yd certainly never vanquished the Evil One, who is not the enemy of any *land-locked* life."

Wink had gone black with shock. "But who would dare blaspheme so—?!"

"God dares."

It was nearly dawn before she lurched from the temple, dazed and quivering. Nor did she hurry to reach the cool safety of her broodhome, but trudged slowly, ruminating. Even when the eastern sky began to whiten and blaze, still she remained more absorbed in the equally blasting illumination within. Only when a fearful, sickly-green alarm blared in her eyes did she realize how late it was. Her broodfoster had come out searching for her, and now yd hustled her along, rattling with anxiety, and blinking and scolding all the way. They kept their eyes curled down below their ventral flanges, hunched against the rising sun.

After reaching the thick rock shelter of the warren, and after escaping her foster's worried lecture, she fled deep into the convoluted passageways, to her own solitary little niche—granted her upon her acceptance into the novitiate. Here she could know peace. . . .

No. Nor ever again.

For how could she have peace when the High Priest had destroyed the foun-

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dations of her universe, even as his own had been destroyed—by God Ydself—some night before?

". . . For God's recent indifference to us had been a matter of grave concern for some time," old Mottling Quickly Changing had told her, when she had partially recuperated from her first shock and bewilderment. "And the highest among us went to the altar and called out to Yd. But Yd saw us not, or refused to see. Then I ordered out the vessel, and taking two others with me to bear witness—and to row—I went in search of God, far out onto the dark waters of the Lake. Then God arose, and I quailed before Yd's vast majesty, and Yd said, 'What would you of me, little hatchling?' And I gathered my wits, and said, 'Your children desire to know by what cause you are wroth with them, and what it is they must do to regain your grace.' And God said, 'Behold, I am not wroth, but deep in thought, for the time approaches for many changes and great events.' Then Yd put me through *my* catechism, as I did you; and Yd told me—Yd showed me—wonders—terrors—and—and we rowed back, my priests and I, that black, starless night, blinded by the light."

"What did Yd tell you—?" she had dared to ask.

"I think I will let Yd tell you all about it, Ydself."

She, she was to see God, to speak to Yd, to watch Yd's slow, divine words with her own eyes! She, Wink!

"—Why *me?*" she had shimmered desperately.

"It is God's will that one go who is young, healthy, strong—that rules out most of the Servants—skilled in communication, skilled in song, whole, sound of mind—that rules out an unfortunately large percentage of Fishers and former Fishers, Servants or not—and especially one who is patient, open-minded, not overly inculcated with the truisms of our society, intuitive, imaginative, and exceedingly intelligent. That rules out most of the general populace; besides, we deem it advisable to keep these new ideas within the Service, for the time being. We also add our own requirements that the candidate have a good citizenship record and a firm understanding of the concept of duty. I made inquiries among the Corps of Priests and the Corps of Broodmasters, seeking names; yours appeared most often.

"As for your entering the ranks of the Servants, it is well known that only a Servant of God may speak and understand the special words of God, is it not? You will take up your new duties as soon as you can complete the special training."

". . . Let it be as you will it, honored one," she glimmered softly. "But am I then never to become a Fisher?"

"You had truly anticipated that?"

"I had awaited it, not with pleasure, perhaps, but with . . . curiosity."

He contemplated her a moment. "The ascetic in you, no doubt. This will be an adventure far greater."

God spoke not as mortals spoke. Who could guess how the divine might meditate within itself upon the universe, or might—staggering thought—commune with other entities of its own kind? For the puny understanding of mortals, however, God had created a light-emit-

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ting organ of Yd's own holy flesh, not one that worked as mortals' did, but one large, and slow, and simple, and stilted in its expression, as befitted the stately dignity of a God.

Because of its limitations—which God had deliberately designed in as a rebuke to the pride of his people, of course—in both spectrum and subtlety of expressible forms, its codings differed not only from those of the language of the Favored People but from those of all the languages of all the other tribes they had ever conquered, converted, or otherwise made contact with. This holy coding system must each novice study, commit to memory, before he or she (never yd) could hope for advancement. Often, the candidates lost much of this knowledge during their years Fishing for God, and needs must relearn it all upon their return to the City. Periodically, over the generations, hierophantic administrators had attempted to abolish this apparently inefficient system, and, for example, send out untutored novices into the wilderness when much younger, and only begin teaching them after they had fulfilled this portion of their duty. But invariably the experiment had failed. The younger ones lacked the mature vigor needed to withstand the solitary vigils in the wild, and an ex-Fisher usually proved incapable of grasping any complex intangible concept unless he or she had already absorbed the root and essence of the idea. Therefore, the pre-adult years must span a very broad base of an eclectic education, only roughly sketched in; any subject of lore which might prove of use someday must be begun then.

Now the repetitious, numerical, arbitrary symbolisms of the language of God became Wink's life. Fortunately, she did not have to learn to speak it herself, since God (naturally) understood the thoughts of mortals even before they became visible; but she had to learn to understand Yd when Yd spoke. She awoke in the evening with a Servant standing over her sand pit, flashing phrases in the measured cadence of divine speech, and translating them with a brief coruscation in the common talk. She ate with the lessons still before her. She performed her devotions at the side of a translator-teacher, who herself was temporarily excused from all other duties. She eliminated her wastes, groomed her carapace and segmented limbs, deposited her as-yet-unformed and non-viable eggs in the loamy area set aside for that purpose, and digested her food with them always beaming at her, in relays. And when she shut her weary eyes in the morning to sleep, still her mind's vision saw them and sought to read them: the eternal *umber, rose, bone, umber, bone, rose, rose, umber, rose, bone* . . . the everlasting *three, two, two, three, one, three, three, four, one, three, two, four, four* . . . the unceasing *up-blurred, up-sharp, left-blurred, down-blurred, right-sharp, down-sharp* . . . the interminable and incoherent *four right-sharp rose, two left-blurred umber, one down-blurred bone*. . . .

They had moved her from her brood-foster's den into the cold stone temple. The halls thronged with other students, acolytes, and votaries; but Wink was alone, pursuing her own unique, intensive, single-minded course, living in her

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own private chamber, small though it was. Sometimes she yearned to escape, to clatter back to old Longstalks's apartments as fast as her six legs would carry her, to renounce the Service, to be free to joke once more with Red and the Gimp and her other friends.

Then the passion of her vocation would possess her once again. *Three left-sharp bone. . . .*

She had to abandon all her other interests. Not only did she now live in isolation from her broodmates and comrades, in itself a great psychological hardship, but even found herself forced to neglect any intellectual pursuit that did not pertain directly to her assignment of communicating with God. The High Priest could not contain his impatience with her progress, though he could not in justice fault her in comparison with what any other individual might have accomplished in the same time. But he had devoted his life to the service of God, and it grated upon him that he could not immediately provide an acolyte perfectly tailored to Yd's request.

Wink watched her childhood vanish behind her in mere days, rather than in the years she should yet have had; she watched the prospect of a normal young maturity snatched forever from her.

She did her best to keep her inner vision firmly fixed upon the High Priest's words: "*. . . an adventure far greater . . .*"

The last lingering rays of light faded from the west; the stars emerged in their uncounted choral swarms, singing their high, exalted, celestial, incomprehensible song.

Slowly, Wink emerged from her dark chamber and made her way through the twisting corridors to the great cool nave. Her claws clicked on the wet flagstones and echoed against the walls as she marched down to the altar. The Servants of God awaited her there, lucent, shimmering—singing hymns, praying.

She passed them and clambered down from the altar—the dock—to the little rowboat, where already sat her two rowers, younger acolytes dark with awe. These knew no God-talk. The wooden blades dipped.

Far out onto the black water, they shipped oars. The boat bobbed. There was no sign of God. On the distant shore, the temple loomed dark; the priests had ended their rituals.

Wink resolutely kept her emotions from showing on her shell, took up her courage, and sang out God's holy name, the long purple glow, with an upper harmonic in the ultraviolet. The waters of the lake accepted it, spread it. . . .

. . . Minutes passed. Wink saw and heard nothing. She maintained the call and her prayerful state of mind. Slowly the uncomfortable certainty grew that she was being watched. Her eyestalks swiveled in all directions. Nothing. Still she gleamed in the upper frequencies, but she was beginning to dim; the strain was beginning to tell.

Suddenly it seemed that Holy Water itself chuckled—a radiating dazzle of silvery sparks expanded in concentric bands, from a point directly below the boat. Then—without Wink's having caught its approach—she found herself staring straight into a huge yellow eye, not a pincer-length away from her own green one. Another eye rose out of the

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water on the other side of the boat—this one was blue—and gave her its thorough attention.

Now—in the light of her own fading note—she could see beneath and surrounding her small vessel a bulk of something huge and dark. A roughly circular patch of it began to glow in the all-too-familiar rose and bone and umber, but refraction at the surface broke up the message. Timidly she dipped an eye into the water.

". . . they have chosen to send me. Welcome to my domain, small hatchling."

The mass of God fell away into the lightless depths on all sides.

Wink went utterly blank. All her coaching momentarily fled.

"Fear not. Take all time needed. My life is long." Again, pale glints of humor accompanied the statement.

At that, her wits returned.

"I abase myself before your almighty divinity," she said, as it had been drilled into her. "I present myself to the will of God."

"Your name is—?"

"I am called Green-Eyed She, Supremely Holy."

"Then, Green-Eyed She, my will is that you not so diminish your valuable self. . . . How much have they told you? Do you know what your work is to be? Has anyone said that God has blasphemed? . . . Feel free to interrupt at any time; I know that I speak too slowly for you little twinkly scooters."

Wink flashed black and orange in rapid succession, astonished and nonplussed. "The High Servant has told me that you have said many of our beliefs are not—are not quite—as we have believed. He said you wanted a young person to talk to, that none of the old Servants would do. They taught me the divine speech as swiftly as my poor weak mind was able to learn it. Now I am here, though I am still learning."

"I rather suspect they harried you, though they need not have. One of your brief generations more or less means little to me.

"Now I will clarify matters somewhat. I want you to be my messenger to your people. I wanted someone young, someone new, because I have noticed that your people have difficulty learning anything strange to them once they have passed the middle of their lives. I wanted someone intelligent because much of what I must tell you will be difficult to understand, and you must be able to explain it to even the most backward of your people in a way they can accept. And I wanted an artistic singer because I enjoy watching your songs and productions. I am often lonely and part of your duty will be to entertain me.

"These are the rules: Most of the time, I will speak, you will watch. But because I speak so awkwardly, you have my permission to flash in whenever you please; you can squeeze whole codas of reply between two of my words. And if you can guess what I am about to say, show me. I will tell you whether you are right and when you are, we can go on to the next thing. That will save some time, don't you agree?"

"Agree? Of course, God. Let it be as God wills."

"That reminds me: this God business. I suppose your High Priest told you about all that?"

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"That you had said—strange and wondrous things, yes."

"Here is truth: I am not God, at least, not in the sense of a creator and regulator of matter and life, or even of the ways of natural phenomena in the world. I control nothing and have made little. Old as I am, I am but a hatchling compared to the youngest of those mountains yonder. Strong as I am, I quail before the sun even as you do, and I can no longer heave myself very far out of the water. Yet large as I am, I would be but a morsel to one who is my enemy, who dwells in the Greater Ocean."

"The Evil One," she said, taking Yd at Yd's word and interrupting.

"Yes. And yd *is* evil; that much of your faith is true. Later we will speak more, much more, of yd; now you are still relearning your concepts of myself.

"I rule your people only because you permit me to do so. Yet you gain from it also; my wisdom and—shall we say—impressive appearance—has enabled your tribe to expand its territory and rise above all other groups of your kind. My gain is that without the assistance of your society I could not long live."

Wink went black.

"Oh, do calm yourself. It is quite true. I eat a great deal. The Lake is not quite big enough to provide for all my needs. Without the labor of your Fishers—well, perhaps I would not starve; I could always reduce. But I have reached a point now where I can diminish no further in size without sacrificing some of my intellect, and I'd rather not. Yet often I have wondered how you could afford to support me."

"But, God! You are the source of all knowledge, all the arts of civilization, all supremacy in intertribal statecraft, all power—"

"Well, good. I suppose I've paid my way. But, little Green-Eyes, I thought you now understood I am no god."

"But what then am I to call you?"

". . . I hadn't thought of that. You may still refer to me as God, if you wish, to your companions, if you feel that would be politic. But within yourself you must not so think of me. Think of me, rather, as—oh, the Prisoner of the Lake. Or, perhaps, your Biggest Audience. Or, Yd Who Waits.

"Or you could call me by my real name, the one given me of old by my friends, my own kind, my long-mourned people."

"And what was that, great one?" she shone softly, suddenly awash with compassion for the divinity.

"Skysinger."

". . . Among my companions, in our own means of communication, I was accounted something of an artist/poet. And I it was who invented eyes and first discovered the glory of the stars. Thus, Skysinger. Of course, in the language of light, I have a serious speech impediment, hence this clumsy code you have striven so diligently to learn; I know I am no singer to you. Still, it would please me. . . ."

"Then I shall make so bold as to call you . . . Skysinger," she answered diffidently.

"Thank you. It has been long and long since I have had a friend to call me a friend's name.

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"Now I will tell you how my people died."

Once upon a time, during the hatchling stage of the world, there lived a Giant Sea Monster. Now, this monster was the very first and only one of its kind, so it had no broodfoster yd to take care of it and love it. And everyone knows that when a hatchling grows up without an yd's fostering love, it turns out not to be a very nice person at all; and so it was with this monster.

It was neither he nor she nor yd, yet somehow all three, so it made a child all by itself. But it did not love its child, for it had never learned how; and it sent the hatchling away into exile.

But the child grew and also made children, and being somewhat foolish (by monster standards) made several of them more or less at once, and these smaller ones grew up with one another to love and enjoy, so they were different from their parent and their parent's parent. Now these new creatures—we will not call them monsters—talked and swam and explored the seas and played with thoughts and made children and enjoyed the world, until one night they realized food was getting scarcer and scarcer, and they discovered that Child—the second monster, you know—had gotten far too big and was eating far too much. They tried to show it the error of its ways, but despite its size and years it had remained rather stupid. Until it could no longer ignore the obvious; and it tried to invade the Greater Ocean where dwelt the Eldest, the First One. But that monster was prepared with many little slave-monsters, strong fighters, and together, they killed the great Child.

This left the other creatures with no immediate problems and they went about their business, though some of them wondered uneasily about the personality of their mysterious neighbor, who never came forth to join their community.

Millennia later, their bad dreams came true, and the monster attacked. First it secretly poisoned two of their kind, to gain what vantage it could; then it gathered up its warriors and invaded. The creatures had always known peace, and had no idea how to fight. They had no natural enemies in all the seas, for they were too big, too strong. . . .

No more. The monster killed them all.

All but one, who had explored far up a river in its younger nights, and who dwelt at this time in a broad Upland Lake. Now this one managed to trick the slaves of the monster into believing they had killed it, and so they reported.

Now the creature in the lake would have been very lonely and unhappy indeed, had it not the friendship of a swarm of tiny little beings who lived in the rocks around the lake, who had helped it immeasurably in driving off the fighters. It knew these little beasts for intelligent beings, though they spoke not as its own people had, and it thought that perhaps in them it had found that which might in the fullness of time be forged into a weapon capable of taking final vengeance upon the monster. For if its little friends ever advanced to the point where they wished to sail the seas to other lands, they themselves would have the monster to contend with. So it counselled them, and they increased,

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and they and the creature both waxed mighty together in strength and wisdom, over the long years of the wheeling stars.

Any questions?

"It is a most peculiar experience, to hear the articles of one's faith so retold, twisted and altered, and made to appear as the myths of outland barbarian tribes, who have no real god to show."

"I hope you are not too deeply troubled, Little Green-Eyes."

"No . . . I don't *think* I am. In some ways, I feel—relief!" A pop of green-streaked orange; surprised realization. "This story makes better sense than the old ones did, in places."

"Good. It is nearly dawn, little morsel. You had better get back home. I am sorry it takes me so long to say anything. —Oh! One more thing. My first new order to your people: Tell them to begin breeding for long and flexible mouth-parts. I'll have something for them to do, generations from now, besides eat."

". . . Eh?!" A cloudy spiral of gray.

"Your pincer-claws are admirably suited for certain tasks, and indeed you can do amazingly fine work with them; I am often consumed with admiration for the offerings your artisans show me. Yet—they aren't quite fine enough for certain things I have in mind. I've thought about it and it seems to me the mouth-parts are the only appendages with any potential."

"But—but God—Skysinger—Great One—how can we 'breed for' any quality?"

"Oh, yes, you are rather hit-or-miss about passing on the genetic information, are you not. It has at least kept you adaptable. Tell me, your shes compete among themselves for the softest, sandiest places to lay their eggs, true? Would it be considered a privilege to lay them on the beaches of Holy Water?"

"Of course! But the priests do not allow it. They have always feared there would be such a stampede that the shores would soon become roiled and fouled, which would be displeasing to God."

"Tell them to build a fence around a large section of the beach, and put guards at the gate. Then let in only those shes with the longest and most supple mouth parts. When they have deposited their eggs and departed, let in only those hes with the same characteristics, to fertilize them. Then permit only the noblest and most successful and most loving yds to gather up the ripened clutches from that special beach, to brood them.

"Let it be known among all the tribes over which your tribe has jurisdiction, that God values such mouth-parts. They will soon work out a similar system on their own.

"And let it be known that the hes who hatch from these special eggs will have special procreative privileges —well, time enough for that a generation from now.

"Just tell them about the fence and the beach, Morsel. And hurry along; light touches the tops of the distant eastern hills."

Her rowers were already pulling for all they were worth.

Night followed night in an unending procession of beauty and delight, and every one filled Wink's young mind

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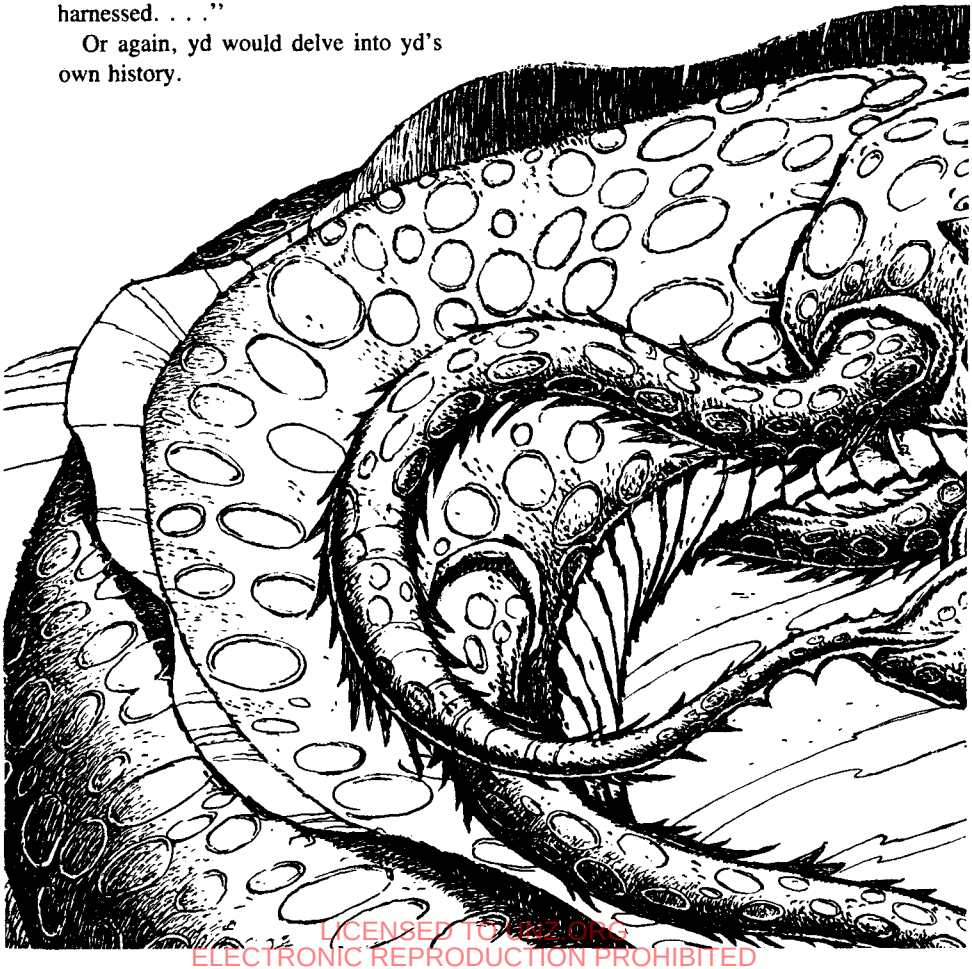
with a maelstrom of wonder, for Skysinger, even in yd's halting coded speech, spun such visions for her as to dazzle her inner eyes. Yd had personally witnessed all of mortal history, and recounted for her eyes the glories of the past, making legends live. And on other nights, yd sang of heroic deeds yet to come.

". . . great vessels of wood, with a thousand rowers . . . or perhaps—have you ever watched the skydwellers, sailing on the air? Perhaps a thousand thousand of them could be tamed and harnessed. . . ."

Or again, yd would delve into yd's own history.

"Among my kind, intelligence was directly related to size. That is one of the reasons I fear the Evil One, for yd must be unimaginably huge by now, and therefore clever beyond understanding. And that is why I puzzled for so many centuries over how you tiny things could have intelligence; yet you obviously did. Finally I realized that you had almost as many brain-cells as I, perhaps, but the cells themselves were extraordinarily small. With that hint, I solved the quandary that had long vexed me, how to increase my own intelligence



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without growing too large for the Lake to support. I began experiments to mutate the motherkind of which I am composed, for smaller and smaller units. It only took a few millennia. I would guess I am now about as intelligent as one of my kind eleven or twelve times my size. Whether that will be enough to out-think and defeat the Enemy, I know not."

Or yd would tell her of the many discoveries yd had made over the long centuries of solitary observation and meditation.

"The stars do indeed form a pattern, one that seems to you ephemeral creatures to be solid and unchanging. But I have lived long enough to watch some of them slowly drift across the silence. See that bright red one? No, there: the one caught in the yellow-white net of other stars. Yes. Well, I remember when it wasn't in that net; it used to be paired with the blue one to the left. And those very bright white ones in a line used to form a triangle. I've thought about it and it seems to me that some stars must be *closer* to us than others, and they move relative to one another; and that is why some of them appear to me to sail across the face of the sparkling blackness."

"Then—the sky is not the great carapace of your first High Priest, standing sentinel over the vault of the world, sending us messages of divine wisdom from the inside of its shell, which we are too stupid and corrupted to read?"

"Of course not! Childish nonsense!"

"And it is not the hollowed-out broodwarren of the world, with airvents to a greater outside world to let light in and smoke out?"

"No. Intriguing image, but I doubt it."

"Then what is it, O Skysinger the Wise?" She had progressed in her confidence with yd to such a degree that she felt almost safe in expressing a little teasing challenge now and then.

"Well—I have wondered whether perhaps the sky—is not simply sky, whether it is not air that just goes on forever. Still, there are reasons why that theory doesn't quite fit, either. . . ."

"And the stars are but another species of skydweller?"

"Oh, no. They're—at least, I *suspect* they are something quite different."

"Well, then?"

"You'll laugh at me if I tell you."

"I shall not!" Wink replied indignantly.

"You will, though."

"How would I dare?! Please tell me."

"I suspect the stars are really suns, like ours, only so remote that—"

She laughed at yd.

But some nights Skysinger seemed melancholy and weary of speaking, and then Wink sang for yd. In the course of time she went through her entire repertoire of hymns; and when yd demanded more, she hesitantly shone some of the secular folk-songs of her people, with many apologies for their imperfections and unworthiness. But yd loved them, of course. Eventually, she ran out even of these. She began to compose her own, but soon discovered that the Muse does not always mass-produce upon demand. The priests sent out novices as runners to all the tribes of the Known World, to gather songs and sto-

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ries for God. Thus began something of a classical florescence. . . .

And on some nights Skysinger and Wink simply chatted together, philosophizing, gossiping, speculating.

"If *you* are not God," Wink asked abruptly, once, "who *is*?"

They worked away at that one (always an entertaining question whenever and wherever it arises), off and on, for countless nights.

And so the nights passed, and the dawns intruded, sending them to their respective nests, she to sleep and dream, yd to ponder and reflect in lonely silence. The nights curled by like the stars, all alike, each unique. . . .

". . . I may be late tomorrow-eve, Skysinger, with your permission. A desire has taken me to speak and play once more with my broodmates and friends. I have hardly seen them for—oh, quite a long time," Wink said vaguely.

"Naturally you may do as you please. You ought not to permit me to take up so much of your life, Morsel."

"But I so enjoy our grand communions, Skysinger, my big old friend," she gently replied. "There is really no-one I would rather talk to than my poor old Prisoner of the Lake."

Next twilight she left the massive white temple through the mighty portals rather than through the pier-altar. The ways of the City of God seemed unusually crowded with jostling strangers; yet always a passage opened up before her as if a great invisible claw had brushed the people aside. As she made her way through the nighted streets —brilliantly lit by a thousand babbling conversations—a wave of gleaming purple seemed to spread before her, followed by a wave of lightlessness and blank dark carapaces. The shadows returned to the streets.

"What word bring you from God, Great Lady?" flashed out one on the edge of the crowd.

She courteously turned both eyestalks toward him. "Only that Yd is pleased with all the labors of Yd's people," she replied, benignly lavender.

Bright white lights erupted around her: huzzahs.

Wink clambered up the ancient trail to the cave where she'd been hatched and raised.

"Longstalks—! It's Wink! I'm home for a visit, but I can't stay long."

A small, glittering, clattering swarm of hatchlings swept past her and scuttled away. The largest of them came but up to her penultimate segment. Silver sparks shivered over her abdomen, in fond nostalgia.

"Longst—?" She brought up sharply. A young yd unknown to her occupied Longstalk's chamber. The brood scrambled around yd, sparkling for attention. "Who are you? Where is Longstalks?"

The young yd hunkered down, scooting backwards and lowering yd's eyes several inches in superstitious awe.

"I am Ringtail Puce." Yd seemed unwilling or unable to venture further.

"Great Lady." A reflection off the ceiling, coming from the mouth of the chamber, caught her attention; she swiveled an eye.

"Gimp!"

"I can answer your questions, Great Lady," yd continued soberly. "They beamed to me that you had come into

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the City."

They trudged in darkness through the tunnels to Gimp's quarters nearby.

"May I ask the Great Lady where her guards are?"

"Guards—? Do drop the Great Lady nonsense, Gimp; we're alone now."

"Nonsense, Great Lady?"

"You know me, Gimp; I'm only Wink."

"As you say, Great Lady."

With a mental sigh, Wink decided to let it pass. After all, one could not expect towering intellect from an yd.

"Where is Longstalks?"

"Longstalks has passed into Holy Water for the glory of God."

Dead—! Wink went black and lowered her upper body to the floor.

". . . When?"

"Twenty-eight nights ago."

"Why was I not told? *Why was I not told?*" she blazed.

"You were communing with God, Great Lady. Who would dare to interrupt?"

Who indeed? Her shell creaked; but the emotion remained locked inside, dark.

". . . Yd was very old," Gimp offered.

"I know, but. . . ."

"Yd was only an yd," yd replied.

"Yd was my broodfoster!"

"As you say, Great Lady."

Time passed in wordless darkness.

"Well. I'll mourn later. I have a half-night break and I must use it well. Where are Red and Sweetscales and Smoothly and the rest of the old swarm? Take me to them; I would see foolish jests and insults once again."

"Smoothly the Rotund He has gone missioning to a new tribe dwelling beyond the Melancholy Mountains. Sweetscaled She has left the Service and joined the Corps of Warriors. And Red-Footed He has been a Fisher these three years and more. I cannot take you to any of them, Great Lady."

"Three—" *Years? Three years?* Had she been gone so long?

"Yes, Great Lady, I know that three years is longer than the normal tour of duty for a Fisher. But it is as he wishes it. He is one of those whom the life of the wilderness has claimed, and now he cannot bear to live in the City of God."

She went to the Lake not at all that night; nor the next, nor the next. She remained in her guarded temple chambers—how long had those guards been there? who had ordered them to guard her?—and grieved. By the twilight of the third night the shock had passed and she could think cogently once more.

She had been "communing with God"—and with no-one else—for over four years. She had never noticed the time passing. She felt she had lived a hundred lifetimes of scholarly acquisition of knowledge, and she did not grudge it—but she had lost so much! Track of the time, her religion, her old broodfoster, her broodmates and friends; and her proper, normal niche in her society. . . .

All I ever wanted was to live in the City of God and sing in the choir, she thought. *I only wanted the natural honors due a Servant, not to be a —a Great Lady, for God's sake!*

Yes. For God's sake. For Skysinger's sake.

And in the time she had remained

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absorbed, her dear broodfoster had died—for the glory of God; and Red—

He never wanted to be a Fisher at all! He feared it so! Now he had succumbed to the mysterious lure that marked so many of those with a vocation to the Service, the "savagery" he had so condemned.

How had she permitted her life to go off on such a tangent? What else had occurred while her attention had fixed so steadily upon Skysinger? Who were all those crowds of strangers? Why were her chambers guarded? (Had there been a slight tinge of sarcasm beneath Gimp's dutiful blandness? "Where are your guards, Great Lady?" "I cannot take you to them, Great Lady.") Well, she knew where to start peering out the answers. She might as well make use of the privileges she had apparently acquired. She marched from her room.

"Guard!" she flashed. "Fetch me—" She broke off and stared. The cavernous interior of the temple had become a bedlam of stroboscopic color. Priests and other Servants scurried about, slipping and iridescing frantically. For a big blue eye just about filled the arched portal over the pier, and a long questing pseudopod of colorless ropy muscle was worming its way hither and thither over the stone floor, dripping mud and frondy weeds, pushing into side-passages, probing. . . .

Oh yes. She'd dared absent herself for two, going on three, nights, and without sending any word.

"*You* I'll get to *later*," she blitzed at Skysinger. "Guard, fetch me the High Priest!" But the young he only continued to goggle at the manifestation above the altar, his eyestalks quivering.

The manifestation blinked twice at Wink's peremptory remark, then narrowed dangerously. But the tentacle ceased its wanderings and retracted, carefully backing out the way it had come, bowling over only a few more Servants in the process. Then the eye itself gradually withdrew, finally to sink into the Lake, staring at her all the while.

"Well?" Her right middle foot tapped. The guard scurried off.

Old Mottling Swiftly Changing greeted her with, "What have you brought down upon us? God is angered! We are doomed!"

"Dim that! We're nothing of the kind. I have questions."

So. She felt used. She felt a fool—twice a fool. While Skysinger had assumed the center and become the purpose of her existence—despite yd's constant protestations to the contrary, yd had always made yd's expectations felt—the orthodox priests had taken steps to defend against what they saw as a threat to their status. They had created for her a special title—one separate from the standard hierarchy—and isolated her from the populace. The guards allegedly were necessary to protect her from the demands of the importunate rabble; idle gawkers and tourists, the priests had characterized them. In fact, she suspected, her escort had probably often "protected" her from seeing old friends and people with legitimate business or with requests she would have been glad to undertake. (What harm could lie in taking prayers to Skysinger? God though yd may not be, still yd had vast wisdom.) They had kept her ignorant of events on the ground that she

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who communed with God ought not soil her semi-divine mind with such mundane, trifling matters. The Servants had always carried out God's commands, relayed by her, with the same pious alacrity with which their predecessors had done so throughout innumerable centuries; but they had usually managed to twist them subtly to their own advantage. For example, most of the skittering throngs out there were outlander males and females, come on pilgrimage to the City of God, in hopes of gaining entrance to God's Beach to deposit and fertilize eggs, and of acquiring *mana* thereby. But since their clutches would be brooded by the local yds, it meant an ever-escalating concentration of the desired characteristic here in the City of God—and under the effective control of the priesthood. Had Skysinger intended this? She doubted it. It seemed to her that quite often yd evinced insufficient concern about all the ramifications and effects of yd's schemes. How much did yd really care about her people? Or was yd so consumed by yd's obsession with vengeance that none of the secondary consequences mattered to yd at all?

But first she must deal with immediacies.

"You were right about one thing, venerable one," she told the priest wryly. "When I am communing with God my mind is so free of common, trifling thoughts that I completely lose contact with mundane reality."

"It is good that your ladyship is pleased with her prodigious evolution," said Mottling Quickly Changing.

"I am *not* pleased," she flared. "Nor have I evolved, prodigiously or any other way. I have simply lost track of the time. Henceforth, priest, you will make it your business to see to it that I have time to live my real life every now and then. And let there be regular times when the people may come to see me!

"And send all those people back home! Tell them to breed on their own beaches, according to the word of God. Do not seek to molt so swiftly into a shell too large for you, old priest!"

"You forget yourself, Green-Eyed She." Dull red lightnings flickered around his words. "You forget to whom you speak."

"*You* forget to whom *you* speak. You saw God at the Gate. Yd was looking for me . . . not in anger, but in anxiety, for when Yd saw me, Yd returned peacefully into the Lake. Consider what Yd might have done had Yd *not* seen me, had Yd, for example, conceived that, for some reason, I was being kept from Yd. Consider that, and keep that image firmly in mind. Now, do you remember the blasphemous words of God, that you told me of four years ago when I was but a novice? Or have you managed to shut your inner eyes against their light entirely? For *I* remember them.

"And now consider what would happen if the populace happened to glimpse such words. How long would they continue to support and obey the Servants of God—if God is not God? How long would the outlying tribes and clans of tribes continue to submit to the domination of the City of God and its priest, if our visible, tangible god is proven no less false than their invisible, insubstantial ones, who never accept the chal-

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lenge to contest for supremacy? They would say, 'Of course our gods would not accept a challenge from a mortal creature, no matter how gargantuan and great.'

"So consider carefully both of those things. And know this also." She softened the harshness of her colors. "I am no enemy to you. All in all, I appreciate my life quite as much as you do yours. While a few small things must change, those things I have mentioned, I would grieve to alter it to any large degree. I do not want your office, or any other. I believe that the City of God should continue to rule the tribes of mortals and the Servants of God should continue to rule the City, for it has always been so, and it is right. *But if I do not get my way,* there will begin to appear in the City glimmerings of dangerous reflections!"

"Great Lady, the words of her who communes with God are always observed with boundless reverence, and it is the privilege of the devout to obey them."

"That's the spirit."

Skysinger offered obstacles of a different nature.

"Where were you, Morsel? I feared something had befallen you."

"Something had—four years had passed in but a handful of days! How could you have done this to me? Did it never occur to you that I might have a life of my own to tend? Ever you claim we are friend and friend, but you treat me as a god would treat a votary."

"Little Green-Eyes, you show me nonsense. Many and many a time have I told you to do as pleased you, to live your life as you would, to give me only such time as you might without hardship; for I have lived many long millennia before you came, small one, and I shall continue to live many long centuries after you go, and my patience is vaster than my body, deeper than my lake."

"Oh, indeed, such were your hues and shapes; but your thoughts were far other. And how can a poor small mortal mind venture so close to the thought of a god without perceiving it, without bending before its strength? No, the truth is, you have dealt with me as you have dealt with my people: you have captured us, and tamed us, and forged us into that which we were not, and made tools of us, weapons for your coming war of vengeance against the Evil One.

"Who *is* the Evil One, O Skysinger, Prisoner of the Lake?"

"You know that," replied Skysinger, surprised. "I have told you that story many times."

"But I am only a mortal hatchling, Great One, and my understanding is small. Please tell me who is the Evil One."

Yd sensed a trap, of course, but decided Yd might as well feed her the lines she wanted, anyway.

"Yd is my ancient enemy, First One, Lord of Mother Sea."

"And what makes yd evil?"

"That, too, I have explained. Yd is so because—"

"I mean, *how* is yd evil? What characteristic is it that designates yd as such?"

Skysinger heaved a windy sigh; big bubbles drifted up and burst upon the

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surface for several dozen square meters around the boat.

"That yd destroyed those whom I loved, that yd will destroy any sapient life form other than itself, including yours; that yd cannot brook *otherness,* much less competition; that yd cannot perceive the equal reality and validity of any other entity; that yd cannot therefore understand the pain of another; that yd seeks only yd's own ends. This latter is, perhaps, the natural goal of all beings, and is not evil in an absolute sense; but it certainly makes yd uncomfortable to share a planet with."

"And whose ends do you seek, Skysinger?"

Yd had seen it coming. "My own, Morsel, and, *and*"—Yd increased brightness in order to override her attempted interruption—"I honestly believe I seek the ends of nature, of evolution if you will. (You recall what I have said of my observations of the way creature-kinds grow and change and die, just as individual beings do.) In making this alliance with your small kind, I have established your supremacy over all the world—not only merely over other tribes of your species, but over all living things on the planet. No, Morsel, not yet, perhaps, in fact; I realize that. You are still simple and weak, and have yet to extend your hegemony over all the ways of the world, and the life therein, and the very elements themselves. But that night will come, countless generations hence, Green Eyes, when this one small world will fail to contain you. I can see it as clearly as I see the stars. *If.* If you can destroy First One in the meantime. By yourselves, you cannot do it. Without my counsel, you may perhaps eventually, slowly, have begun to venture out upon the face of Mother Sea in vessels, millennia from now—and First One would become aware of you, and would inevitably put an end to you, and yd would remain lord of all yd surveys until sky and world end. With my assistance, you might possibly have a chance. And who better to ally with you in that cause than I? Am I not the Enemy's enemy? Yet by myself, I have no better chance than you.

"Since this war, one way or another, is inevitable, ought we not to devise the best odds for ourselves that we can muster? I do not guarantee our success, even as allies; but together we have the greatest hope."

"And what of my people, in the meanwhile?" Wink flared out. "In our unnumbered thousands since the beginning of time we have shaped and constrained our lives to fit your huge designs. We have worshipped you as God, and what other nameless gods may have gone unworshipped for that reason? What of my friend Red-Footed He, who has fallen into the trap he feared, and reverted to savagery in your service? What of those weary hundreds of outlanders who made a pilgrimage of who knows what trials and privations, because the priests chose to skew slightly their interpretation of a divine whim, and because you concerned yourself not with its consequences? And what, O Skysinger, of *me?* While I have conversed with you upon subjects great and petty, while I have soothed your moods and tempers with my songs, while I have thought how to please you and given no thought to anything else—all

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my friends have died, or gone, or changed. Gleam not to me of sky-high speculations and epic adventures I will never live to see! Even as you have no-one else to call you by a friend's name, so there is now no-one left to call me Wink!''

Yd's coded pulsing slowed and a rosy aura suffused even yd's bone-and-sienna symbols. ''With your permission, then, small one, I shall use and preserve that name of friendship . . . if you accord me the name of friend?''

Wink admitted defeat at last. ''You know, Skysinger, that it is my everlasting honor that you have chosen to share with me some small portion of your thoughts, just as if we were really equals. If you grant me friendship, can I do less? But surely in your wisdom you understand that no matter how high a grace it may be to see my name in your colors, still I miss the same name in the old familiar spectra of my lost comrades.''

To her surprise, and indignation, silver laughter rippled beneath the waves.

''What a species I have undertaken to raise! Wink, try not to keep your inner eyes squeezed so tightly closed. Open them now and look at your thoughts: is your sorrow a soul-hunger or only a petulant melancholy?'' When she remained dark yd continued. ''I know your people better than you know yourselves; I have had hundreds of generations to observe you; you, Morsel, have had but the first part of a single lifetime. And I have observed that only yds truly love; the most profound attachment a he or a she can feel is a kind of shell-bound sentimentalism. I have thought about it and it seems to me that it is because the hes and shes never touch; only the yds touch. The yds devote their lives to caring for people; the hes and shes devote themselves solely to abstract concepts, ideals, group-identities. This trait promises well for you in the time to come, in the plans I have for you; but do not try to dazzle me with the glare of your profound yearning for your friends. Your yearning, Green-Eyes, is but a nostalgia for the way things once were, and can never be again; for none of your kind accepts change gladly. Why this should be, I'm not certain; it may have something to do with the fact that your childhood moltings into larger carapaces are such traumatic experiences for you. It is the only thing about you that makes me doubt your complete suitability for the great project. But change and adaptation are the very substance of *my* species, and perhaps each of us can complement the other smoothly enough to promote our success in the grand alliance.

''No; dim it; don't interrupt. Consider honestly, little friend. You are angry with the priests, and you are angry with me, and for all I know you may be angry with the weather, because we have all conspired against you to steal your wonted life away. But who, I ask, has come out here every night, storm or starlight, to study and sing and philosophize? Who wakens her poor hard-working rowers earlier and earlier every twilight? Who is it who neglected her shoreside life—and for what cause, pious devotion to duty? I think not. I believe you find me quite as entertaining as I find you. Is it not so?'' But Wink stubbornly refused to emit a spark. ''Don't be foolish,'' Skysinger admon-

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ished. "I will confess to every charge you level that speaks of my manipulation and control of your species; but I am innocent of any ruination of your personal life, small one. That you must confess yourself, if you think it has been ruined."

It was true. She had to admit it—at least to herself, if not to yd. Discovering all the changes that had taken place in her absence—her absence of mind—had proven quite a shock; but that shock was now slowly diminishing. She missed the ways of her childhood, but no-one could remain forever a hatchling under the care of a broodfoster yd. Exactly how much did she truly care what those barbarian pilgrims in the City of God did in their spare time, or where they did it? And, with Red-Footed He the way he was now, they had nothing to say to one another.

As for Longstalks, she had loved yd as much as any he or she had ever loved a broodfoster. But yd was only an yd, after all.

Would she indeed return, if she could, to the nights when she was a novice in the choir, and nothing more?

No. Upon reconsideration, she would really rather continue to discuss light opera with Skysinger

". . . Good," Skysinger said some hours later, after they'd thrashed it all out and renegotiated their arrangement. "Because you and I are just beginning our work together, Green-Eyes. I shall keep in mind your admonishment to take greater care of the consequences of my demands; but you, Wink, and your people, must accustom yourselves to the occasional changes we will make. I hope you have not too mortally offended the priests, because I have one or two little notions I'd like them to try out as soon as may be. For one thing, I have thought about it and it seems to me that what this Lake needs is a shipyard over on the far end. It's none too soon. No, I know you don't know what a shipyard is; I'll explain it all when I give you the plans to relay to your artificers and crafters. And when the priesthood calms down, why don't you talk to them about establishing a Corps of Beacon-Runners?—What is that? Why, that is a way of letting the people of the City of God learn swiftly of whatever interesting may happen, even in the farthest bounds of your tribe's dominance; do you see? And another thing, Wink, can't you get the priests to work out a better educational system? I have thought about it and it seems to me . . ."

And on they shimmered and shone at one another, rippled and rayed, scheming, coruscating, arguing aglow, long into the nights, while the stars above sang a waiting song. . . .

The rowers dipped their oars slowly, in time to the stately pulses of the dirge: deep purple, grays, blues, white. A single large bark glided after the lead boat, carrying priests and choristers.

But the ancient, awesome old High Priestess was not quite dead, not quite yet. Her spectrum was still as pure as ever.

"God!" she called out, piercingly violet. "I pray you appear unto your servant!"

A surge beneath the waves rocked the boats.

"What's all this, Morsel?"

"A state occasion, Great One. A

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grand sacrifice. I am High Priestess. I officiate."

"Good. I could use a snack. I am delighted that you are healed of your recent illness, Wink, and can take part once more in these social functions. I missed you."

"I am *not* healed of my illness. I am old. I am positively antique. My eyesight is failing, and soon I will no longer be able to see you, to converse with you. I have seen little glimpses of rumors among the younger Servants of God, hastily dimmed when I enter the room, to the general effect that my carapace has hardened around my brain.

"Skysinger, old friend, all the symptoms point to one little fact: the time draws ineluctably near when I will go into Holy Water for the greater glory of God."

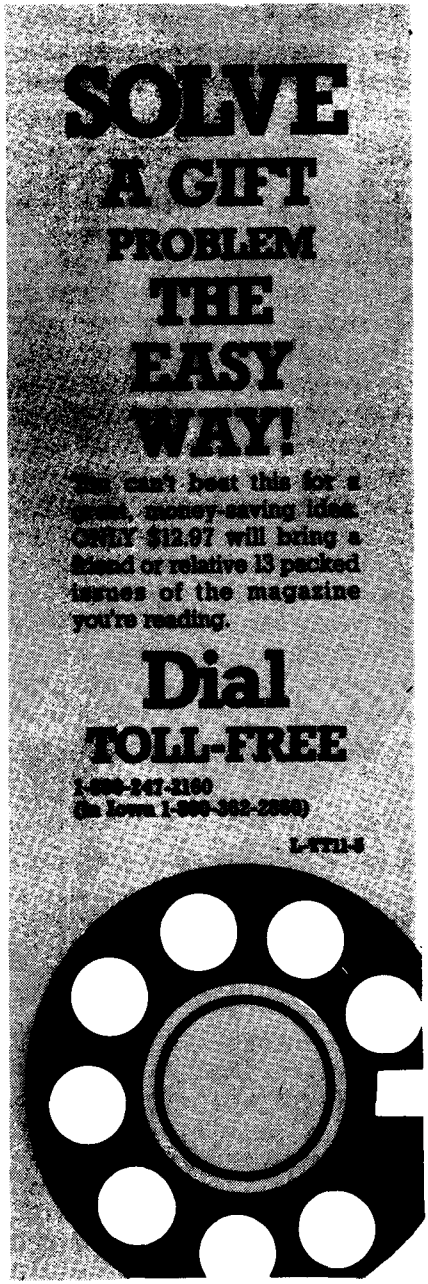
"I see. And why are you here now, Morsel?" yd gleamed softly.

"Hmp!" A fuchsia spark. "You know perfectly well! I've no intention of becoming one more anonymous piece of flotsam in the Lake, while my empty shell goes to stand sentinel in the Temple! No; you're going to recognize who I am when I go, and say goodbye properly, and acknowledge my passing! —And, incidentally, I find the tag 'Morsel' less than tactful, under the circumstances!"

"I see."

"Stop saying 'I see'! Of course you see!" she blipped cantankerously. "I just showed you, didn't I? *You're* not the one going blind! Well, then. This is it. This is *not* a dress rehearsal. Everyone's in good spectrum today; they've been practicing for weeks."

The yellow eye snaked up out of the



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water and gravely surveyed the melting, glowing colors coming from the mighty boat, the proud flagship of the great building yards. "Very harmonious."

Wink stood up and teetered cautiously upon the gunwale of the smaller vessel, the traditional coracle. Skysinger noticed her hesitation.

"Green-Eyed She, our association has given me much delight over the years. I shall miss you terribly. . . . You have grown in wisdom under the wheeling sky. I suspect you have learned not only the clear sight of the mind, but even to see by the wavelengths of love that only yds heretofore have perceived. Yes, I believe you have come to love me as much as I have always loved you, little one. This achievement I honor. I acknowledge your passing with great respect. . . . And I promise you won't feel a thing."

Wink's carapace sagged just briefly; then she gathered her courage.

"Into thy maw, oh God, I commend me, body and soul," she said, somewhat ironically; and she closed her green eyes for the last time, held her breath, and jumped.

But a huge tentacle caught her before she hit the surface, to save her the instinctive panic all her kind felt in the water; and a giant claw neatly snipped the braincase from her thorax.

Then there was a great *crunch*. . . .

The state funeral procession rowed back to shore, still shining brightly, some of the mourners already beginning to argue over the selection of the new Supreme Hierophant.

And Skysinger chugged back into the dark, still depths, feeling once again an overwhelming, inexpressible loneliness. . . and perhaps a touch of indigestion. . . . ■

● If we would appreciate our own civilization, this elaborate pattern of life which we have made for ourselves as a people and which we are at pains to pass on to our children, we must set our civilization over against other very different ones. In remote parts of the world, under historical conditions very different from those which made Greece and Rome flourish and fall, groups of human beings have worked out patterns of life so different from our own that we cannot venture any guess that they would have arrived at our solutions. Each primitive people has selected one set of human gifts, one set of human values, and fashioned for themselves an art, a social organization, a religion, which is their unique contribution to the history of the human spirit.

Margaret Mead

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Robert E. Skinner

SCIENTIFIC RESEARCH MADE EASY

Whether you're doing original research or backgrounding a story, you need to know what's been done before. Present technology can take a lot of the pain out of the process.

One of the recurring themes in modern speculative fiction is the idea of a universal-knowledge computer which will, on command, give information on any subject. In *Shockwave Rider* John Brunner depicted a society in which every dwelling had its own computer terminal, and each citizen was paranoid over the possibility that his neighbor had some piece of information that he, himself, didn't. In the old "Star Trek" television series, a standard feature of nearly every program was the moment when Captain Kirk ordered Mr. Spock to query the ship's library computer for some bit of arcane information that would help to solve the problem at hand.

Somewhere, as you read this, there is a researcher in some discipline who is wishing he had access to a computer that would describe the work already done in his field, or is laboriously going through an index to find a paper that will answer some question that has come up and must be answered today. The fact is, these researchers are putting themselves through a lot of needless agony and are delaying their projects unnecessarily. Computers are, and have been, a part of our lives for over thirty years, but no one (or at least very few) has yet made the connection between information and computers.

Part of the problem can be laid to the

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fact that many people whose business it is to perform research seem to have only a hazy idea of how to get started. The pre-research literature review is the step most people can't bear to face, because it requires the painful, laborious, and sometimes frustrating process of going through indexes and bibliographies to see what has already been written. Since many people in research have received inadequate (or not any) formal training in conducting research, this step gets done very poorly or is left to a subordinate (who may also be poorly trained). Worse yet, it may be passed over entirely.

The purpose of this article is to describe how the efforts of computer experts, information specialists, and indexers have joined together to take the toil and the guesswork out of research. Mr. Spock is alive and well in your own backyard.

Historical Development

Rapid yet effective retrieval of information is not a new idea. Scientists and researchers have always had a need to know quickly, but the development of the hardware that would provide instantaneous retrieval is a rather recent development. The trends in information access have followed a route outlined below:

1. Before the 1940s, there were mostly card catalogs and printed book indexes.
2. During the period 1940-1949 came the first application of semi-mechanized approaches, such as edge-notched cards and optical coincidence devices. The Rapid Selector, the first microfilm searching system, was also developed.
3. During 1950-1959, we saw the first fairly widespread use of punched-card data processing equipment, some early computer systems, and further development of microimage searching systems.
4. Between 1960-1969 there was more general application of digital computers to information retrieval in an offline, batch-processing mode, some experiments with online, interactive systems, and more advanced microimage systems.
5. From 1970 to the present, the trend has been toward the design of online systems and the conversion of batch-mode systems to the online mode.

Before we get too much further along, I want to acquaint you with a word that you will see a lot of in this paper: online. Applied to a computer system, it implies real-time, instantaneous interaction between a human operator and a computer. An *online search* is a search for information utilizing such an interactive system.

There are hundreds of online systems available in the United States and abroad these days, offering everything from stock market reports to the daily headlines of the *New York Times* to information on patents. I am not going to talk about all of these, because I started this paper talking about researchers in scientific fields. For that reason, I am only going to mention four systems. These are online systems that offer a preponderance of scientific information

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in both the hard and soft sciences. As you would expect, most of them are known by acronyms: they are called DIALOG, ORBIT, ELHILL, and BRS.

DIALOG

DIALOG is a proprietary system that was developed by the Lockheed Missiles and Space Company's Palo Alto, California, research lab about 1966. The program was originally produced for NASA and is still being used by them and the Department of Energy under the acronym RECON (REmote CONsole). DIALOG is still being developed and improved by Lockheed and is considered by many to be the leading information retrieval system in the world today. It offers considerably more than 100 different databases and is available to anyone with the necessary equipment and the cost of the computer connect time.

ORBIT

ORBIT (*O*nline *R*etrieval of *B*ibliographic *I*nformation *T*imeshared) is a proprietary system of the System Development Corporation of Santa Monica, California. It also has been around since the late sixties and grew out of an earlier system developed for the Foreign Technology Division of the Air Force Systems Command. Like DIALOG, it offers a large number of databases in many diverse fields, and is available to the general public. The ORBIT program is also used by the National Library of Medicine for its MEDLARS system. At NLM, the program is known as ELHILL.

ELHILL

MEDLARS (*MED*ical *L*iterature *A*nalysis and *R*etrieval *S*ystem) was an in-house word processing system developed in 1964 for the National Library of Medicine to produce its internationally known *Index Medicus* and to conduct batch-mode literature searches of that index. In 1970 the National Library of Medicine offered a limited online access to MEDLARS called AIM-TWX (*A*bridged *I*ndex *M*edicus by *T*eletype*w*riter E*x*change) to a network of 61 medical schools and hospitals. By 1972 the amount of information available was expanded to include all of the MEDLARS tapes, and was loaded on a larger computer at the SDC ORBIT installation in Santa Monica. SDC eventually modified the capabilities of the program to suit the NLM's specifications, and it became known as ELHILL (after the *L*ister *HILL* National Center for Biomedical Communications). The online database available through ELHILL became known as MEDLINE (*MED*LARS ON *LINE*) and is, today, a mainstay in medical research. Though there are a number of medicine-related databases now under ELHILL, the impact of the early database on health researchers has been such that now all online searches for biomedical literature are referred to as MEDLINEs.

BRS

BRS (*B*ibliographic *R*etrieval *S*ervice) of Scotia, New York, is a relative newcomer to the field, having been around only since 1977. It came about through the efforts of a group of medical information specialists and librarians who wanted to make more online information available to more people at a smaller cost. It offers a smaller number of databases than either ORBIT or

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DIALOG, but the ones available are those which are most often used by people involved in scientific research. The ability of BRS to offer the essentials for less money has made it a favorite with cost-conscious academic institutions and a formidable competitor to the larger established systems.

What's Available Online and How Did It Get There?

OK, so now you have a lot of acronyms and a little history, but what does all this have to do with making research easier? Just this. These systems we have been talking about have hundreds of files of information in them. Some of these files cover as many as ten to fifteen years of material. The files can be searched by subject category, author, and by some other ways that you probably hadn't thought of before.

How did all of this material get inside the computer? In the "history" section of this paper I mentioned that before 1940 there was little more than printed book catalogs (or bibliographies) and journal indexes. I don't wish to imply that there is anything simplistic about the development of these tools. The development of indexing has a history longer than that of computer science. Indexing is, itself, just as exacting and, at times, as complex as computer programming.

Suffice it to say, then, that regardless of your field, one or more of these printed indexes or bibliographies provide an access to the literature in that field. Some have been around since the late nineteenth century, and have been updated every month or so since then. If you are an engineer, there is *Engineering Index*. If you are a physicist or an electronics expert, you would use *Science Abstracts*. Biologists and chemists rely on *Biological Abstracts* and *Chemical Abstracts*. If "soft science" is your realm, there is *Psychological Abstracts, ERIC,* or *Sociological Abstracts*. Medical people will be familiar with the *Index Medicus* and the *Excerpta Medica* series. And on and on. If you are an environmentalist, an astronomer, or even an historian or a musician, there is some sort of printed access to the literature of your field.

In recent years nearly all of the publishers of journal indexes have gone to automation for a more rapid and error-free production of their product. Instead of relying on typesetting, most publishers rely on sophisticated word processing equipment and keypunch operators that input on computer tape what will eventually show up in the index. The taped information is fed into highspeed photoduplication machines which, in turn, produce the index. These same tapes are made available to one or more of the online systems mentioned earlier. It is important to note that when you conduct a search on a computerized version of an index, the computerized file contains exactly the same information as its printed equivalent.

How a journal paper gets into the index and, in turn, the database, is the job of the indexer.

Indexing

Each index publisher subscribes to the journals in the field he wishes to cover in his index. He has a section of his organization devoted to indexing. The individual indexer is usually at least

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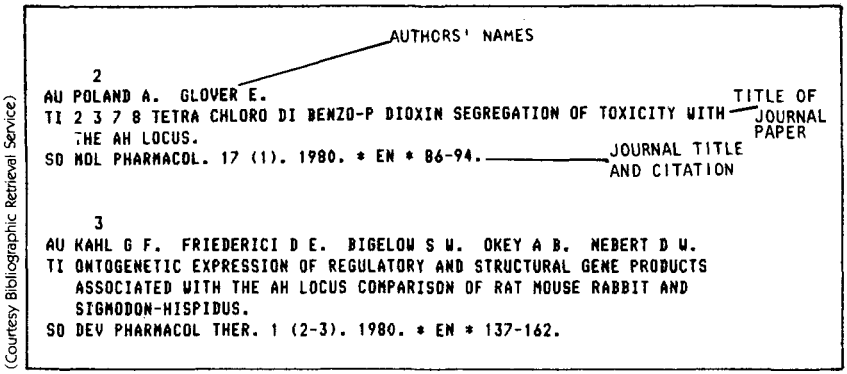
AUTHORS' NAMES
2
AU POLAND A. GLOVER E.
TI 2 3 7 8 TETRA CHLORO DI BENZO-P DIOXIN SEGREGATION OF TOXICITY WITH THE AH LOCUS.
TITLE OF JOURNAL PAPER
SO MOL PHARMACOL. 17 (1). 1980. * EN * 86-94.
JOURNAL TITLE AND CITATION
3
AU KAHL G F. FRIEDERICI D E. BIGELOW S W. OKEY A B. NEBERT D W.
TI ONTOGENETIC EXPRESSION OF REGULATORY AND STRUCTURAL GENE PRODUCTS ASSOCIATED WITH THE AH LOCUS COMPARISON OF RAT MOUSE RABBIT AND SIGMODON-HISPIDUS.
SO DEV PHARMACOL THER. 1 (2-3). 1980. * EN * 137-162.
(Courtesy Bibliographic Retrieval Service)

Figure 1. A typical pair of journal citations.

a Master's-level expert in the field being indexed.

The indexer's most important tool is his thesaurus. This is a dictionary listing of the terminology used in his field. It is usually produced by the indexing section for its own use. In most cases it is updated annually or semiannually to accommodate changes and obsolescences in the terminology.

As the index publisher receives the individual issues of the journals to which he subscribes, he passes them on to the indexer. The indexer reads the individual papers in each journal and, on the basis of his understanding of the content, he assigns several index terms (or descriptors) chosen from his thesaurus.

The indexer sends the basic information about the journal article to the keypunch operator. This information consists, at minimum, of the authors' names, title of the paper, journal citation, and descriptors (see Figure 1). In this way, the printed index is produced with both subject and author access.

This is how the journal citation gets into the computer. Next, we will discuss how one uses an online system to retrieve it.

How Is It Done?

The man we have to thank for our ability to search a computerized index is George Boole (1815-1864), a British mathematician who gave us Boolean Algebra, or Boolean Logic, as it is known among professional information specialists and computer scientists. Briefly, and without launching into a treatise on mathematics, Boolean Logic allows one to combine sets using the operators AND, OR, and NOT.

Just for a moment, let's hark back to our discussion of indexing. Remember that every paper that is included in one of those indexes we mentioned is described by the indexer with a number of descriptors chosen from his thesau-

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rus. The person who will search the database must, ideally, also have a copy of this thesaurus. He *must* know exactly what terminology is available to him when he begins his search. On the basis of his knowledge of the subject in question, he must choose the descriptors from the thesaurus that best describe the question. For example, suppose you wanted to find papers that described the effect of increased altitude on blood circulation. You could tell your computer to perform the operation in Figure 2. Then, suppose you were only interested in human studies. You would have to tell the computer to exclude everything indexed under ANIMAL (see Figure 3).

This is a very simple example of how one performs a subject-approach search. Suppose you wanted to see all the papers written by a certain author over a certain period of years. This is easily performed by simply keying in the author's name:

JONES E B

If you knew that E B Jones wrote about a certain subject only with J T Smith, you could limit out all the papers that Jones wrote about other subjects by telling the computer

JONES E B AND SMITH J T

All of the systems we have mentioned in this paper are extremely versatile and are capable of performing other operations than simple author and subject searches. A few years ago, when I was working as an information specialist at an Air Force research laboratory, a research assistant came to me with what seemed to him an insurmountable task. His chief had told him that a paper had been written about galvanic skin response during the late 1960s. All he knew about it was that it had been written by an experimental psychologist at the University of California at Davis. Needless to say, this would have been a tall order if he had only been able to look at each volume of *Psychological Abstracts* for every paper written about galvanic skin response. However, time

Figure 2

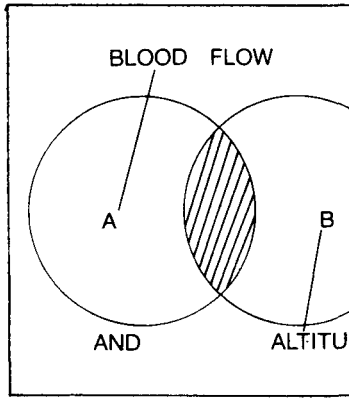
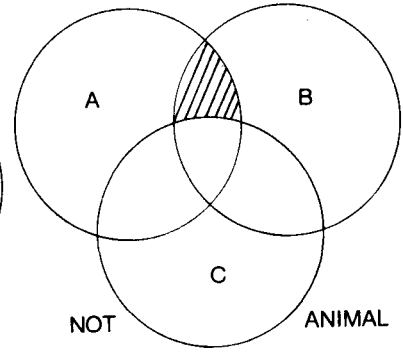


Figure 3



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```
*SIGN-ON   19.55.17                    05/26/81:

BRS/PSYC/1967-APR81

BRS - SEARCH MODE  - ENTER QUERY
    1 :    GALVANIC-SKIN-RESPONSE
    RESULT     1143

    2 :    DAVIS.IN.
    RESULT      876

    3 :    1 AND 2
    RESULT        2

    4 :    ..P 3 AU.TI,IN,SO/DOC=1-2
     1
AU TART-CHARLES-T.
IN U. CALIFORNIA, DAVIS.
TI PATTERNS OF BASAL SKIN RESISTANCE DURING SLEEP.
SO PSYCHOPHYSIOLOGY. 67, 4(1), 35-39.


     2
AU LAKIE-WILLIAM-L.
IN U. CALIFORNIA, DAVIS.
TI RELATIONSHIP OF GALVANIC SKIN RESPONSE TO TASK DIFFICULTY,
   PERSONALITY TRAITS, AND MOTIVATION.
SO RESEARCH QUARTERLY. 67, 38(1), 58-63.

R0601 * END OF DOCUMENTS IN LIST


BRS - SEARCH MODE  - ENTER QUERY
    4 :    ..O
*CONNECT TIME   0:01:27 HH:MM:SS     0.024 DEC HRS
SESSION   339*

EST PSYC COST:  CHRS...$.38  DB-ROY...$.72  COMM...$.12
TOTAL..$1.22

*SIGN-OFF  19.56.27                    05/26/81:
315 20B DISCONNECTED 0:1:38 20 13

@
```

(Courtesy of Bibliographic Retrieval Service)

Figure 4. An actual search on the PSYCABS database.

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was of the essence, and an online search of the PSYCHABS database handled it easily. First we retrieved all the papers indexed under the descriptor GALVANIC SKIN RESPONSE. Then we asked the computer to retrieve all the papers with the word DAVIS in the institutional affiliation field (a field that tells where the author worked or was affiliated at the time of his authorship). By putting them together, we found the paper he was looking for, plus another one that his chief didn't know about. Total time spent on the search, one minute and twenty-seven seconds (see Figure 4).

How To Get Started

There are two routes to take in making use of computerized information retrieval: You can either do it yourself or pay someone else to do it for you. Many find the second choice to be the most practical. At this writing, all medical schools, most major universities, and many private research laboratories, pharmaceutical companies, and other private organizations have facilities in their libraries or information centers for online searching. Usually each place will have at least one person, and usually several people, who are experts in this type of work. They can talk to you about your individual question or research needs, devise the proper search strategy, and perform the search, usually while you wait. They will often charge you a small fee for doing the search, and will help you find the items that the search has retrieved for you.

If you don't have access to an institution like one of the above, you may be able to find a private individual who will do the work for you. They usually call themselves information brokerage firms, or information consultants. These outfits can be fairly large firms with many resources, or may be an individual who happens to have the equipment and the expertise to search in his spare time. Most of these firms will also be able to obtain the papers, articles, or other documents they retrieve online as part of a "document retrieval service." These consultants will charge you a slightly higher fee than the libraries, but their overhead is much greater.

No matter who you get to search the literature for you, you have to expect to involve yourself to some degree to insure the success of the effort. The information specialist doing the search may be the best in town, but you can bet that he will not know your specialty as well as you do. There are several things that you must do in preparation before you approach the online searcher with your question:

1. Reduce your request to a specific and succinct statement. The more specific you are in the beginning, the less likelihood there is that the searcher will have to interrupt the search to clarify points.
2. If you are familiar with the printed equivalent of the database that will be searched for you, check the index categories so that you can advise the searcher on the proper terminology.
3. Be prepared to take a few minutes to acquaint the searcher with your project so that he or she will be better able to understand the request.

If you are adventurous and have some

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money to spend, you may wish to buy the equipment and get started doing your own searching to avoid the middle man. If you already own one of the many desk-top computers that have become popular in recent years, you are over halfway there. If not, you need to purchase a data terminal. These are available in many shapes and sizes and range in price from under one thousand to several thousand dollars. There are two basic types: the internal printer terminal and the cathode ray tube (CRT) terminal. Of the two, the printer terminal is the cheaper and more practical. You find pretty quickly that if you have a CRT with no printer attached, the speed with which you retrieve information is quickly nullified by your having to write everything down by hand from the screen.

Print terminals are either impact type, utilizing an inked ribbon like a typewriter, or thermal printers. These utilize heat sensitive paper and a thermal print head. This type is quieter, but much more expensive. So is the heat-sensitive paper that goes along with it. A major disadvantage to heat-sensitive paper is that it must never be exposed to extreme heat. A printout from one of these terminals that is left in your car on a summer day will be fogged and completely useless when you return. Also, heat-sensitive paper seems to have a somewhat limited shelf life.

Another factor to consider in purchasing a terminal is the speed at which it prints. At this writing, three speeds are available: 10 cps (characters per second), 30 cps, and 120 cps. Ten is really too slow and is little used these days. Thirty cps is about right for the average user, but if you plan to do an unusually large volume of work and need to conserve money, 120 cps is for you. Telecommunications charges are higher for 120 cps, but you more than make up that loss in the computer connect time that you save with the faster speed. I hasten to add, though, that usually only busy professionals find that they have to resort to this faster terminal.

All telecommunications between you and the various online systems are handled by telephone. Many users can beat the cost of long-distance telephone charges by using one of the two national time-shared telecommunications networks available in the United States, TELENET and TYMSHARE. These two companies provide facilities called "ports" to online users in cities all across the country. The number of available entry ports varies from community to community on the basis of activity. All of the online systems discussed in this paper provide lists of TELENET and TYMSHARE telephone numbers for 30 and 120 cps for cities all over the United States and Canada.

Whether you use a professional data terminal or your hobby computer, you must have a piece of equipment called a modem (MOdulator-DEModulator) to make the connection from your terminal to the computer. Some professional terminals have them built in, but some do not. They are not particularly expensive and can be purchased for use with terminals and small computers. The function of the modem is to convert the digital messages which the terminal and the computer understand to analog messages which are capable of being trans-

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mitted across telephone wires. With this box attached to your terminal, all you need do is dial your local TELENET or TYMSHARE number, plug the phone receiver into it, and you can be ready to search in seconds.

Besides the terminal and modem, the most important thing that you need to begin searching is access to one of the four online systems we have mentioned. Telephone numbers and addresses for all of them are provided in Appendix 1. DIALOG and ORBIT are currently the simplest to gain access to. A call to either of them will get you the necessary paperwork to gain your entry into their system. They will require you to sign a contract with them that states that you will pay the charges billed to you for the time that you use on their computer. BRS will treat you in a similar fashion, but will require you to contract to use a minimum number of hours of connect time over a period of a year. It is wise to carefully consider how much research you will be doing before making a contractual arrangement of this kind. It takes a lot of doing to use up even one hour of computer time doing the kind of research we've been talking about here.

ELHILL, which is a government-owned and -operated system, is somewhat restrictive as to whom it will let utilize its facilities. The system was founded to provide information on medically related topics to medical school libraries and hospitals, but at times they have relented and granted access to some private firms and organizations. If you are really interested in doing medically related research on your own, access to ELHILL's MEDLINE database is currently available through both BRS and DIALOG.

Since I have several times mentioned the small matter of paying these companies money for the use of their services, I will elaborate. As I said before, these four online systems are made up of a large number of individual files, or databases. Each one of these files belongs to another company, usually the publisher of the database's printed counterpart. Each publisher leases his file to the online systems at a price (called a royalty), which is, in turn, passed on to the searcher at his terminal. The prices for using these databases can vary from as little as $25 to as much as $150 per connect hour. If that sounds like a lot of money to you, don't let it frighten you away. Remember, it takes only a fraction of the time to search a topic online that it takes in a printed index. An average searcher can, if he plots out his strategy in advance, perform a usual search in about ten minutes. Since most of the files in the sciences range in price from $25 to $65 per connect hour, it is hard to spend more than $10 to $20 in most cases. Since it is possible to have the computer print out your retrieval at the computer site, you can save the time it takes to print at your terminal and get a tailored bibliography in the mail in about four days. This is known as an "offline print." All of the systems offer this service, which provides an attractive, reusable listing of your retrieval for only a few cents per citation. For broad searches that retrieve several hundred citations, it is a must.

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Formal Training

All of the systems I have talked about here have regular training sessions and update meetings for users on a year-round basis all across the continent. Each system has a news publication that is issued monthly to all users that will keep you informed as to new features and changes in the system. There will always be a chronologic list of training sessions in the publication that will include where the session will be held, the expertise level of the session, and how long the session will last. These scheduled sessions are inexpensive and usually last from half a day to a day and a half. They are well worth the expenditure in money and time, as they will provide you with expertise on the system that you couldn't gain on your own. They also provide you with information on different databases and will tell you how to obtain such things as thesauri and user aids for each database (many are free) that will make searching easier for you.

You should never forget that time is money when you search by computer. You are doing it to save time and money, and you owe it to yourself to learn as much as you can about the system you use and the databases in your field before you begin.

Online Document Retrieval

Another feature of some of these systems that will be of immense help to you when you begin to do your research online is online document retrieval.

How many times have you been to a library to find a government report or some esoteric journal article only to find out that the library didn't own it, or it had been stolen or vandalized, or was at the bindery? Everybody has had this happen once, and it usually happens at the worst time. Never fear, though, there is a way to beat this problem. All over the United States, and in other parts of the world, there are firms of varying size that make it their business to provide, on demand, anything in print that you can request. Many of these make use of the document retrieval feature available on both ORBIT and DIALOG.

Some of these document retrieval centers will let you open an account with them; others will let you pay by credit card. Most will charge from $5 to $10 to find and send the document to you by special mail. If you are desperate to see something, that price for a twenty-four to forty-eight-hour turnaround is well worth it.

Things To Come

It took online information retrieval a relatively short time to reach its current level of sophistication, and new, exciting developments now are happening practically daily. Since computers equipped with voice synthesizers are already in existence, we may see Mr. Spock's talking computer long before the twenty-fifth century.

Chemical Abstracts Service has recently developed a new online system. This system, which utilizes a graphics display, allows chemists to do substructure searches on their specially equipped terminals. This is the first time that computer graphics has played a part in online information retrieval, and it heralds

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many exciting things.

Another new development from CAS is a private test file of 1,000 journal articles. Built in partnership with BRS, this special file contains not just citations and abstracts, but the full text of all 1,000 papers. The file was built to test the efficacy of being able to search the full text of a paper rather than just an index term field. More importantly, perhaps, is the fact that it signifies a day in the future when all literature will be computer accessible. Imagine the prospect of being able to read all of the literature in your field of interest, whenever you wish, in your office or home. With the costs of professional journals and even popular reading materials drastically on the rise, one can imagine the impact that computer access to complete texts of any literature will have on the future. It will mean, for many, the constant, instantaneous availability of information and knowledge.

Conclusion

It is interesting to note that in spite of the advances in information processing and handling that have come to us in the last few years, many of us are not aware of how easy it is to answer a simple question in any given area (even our own).

As the distinguished information scientist, Eugene Garfield, observed a few years ago, we are a very "information conscious" society, but we are far from being "information literate." Our society runs on information more than at any other time in history, but most of us are powerless to find the answer to a question or perform proper research in an effective way. The difference between being "information conscious" and "information literate" is the difference between thinking that there may be an answer to a problem and knowing exactly *how* and *where* to look to find out. ■

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APPENDIX I

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Palo Alto, CA 94304
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800-352-6689 (in CA)
800-421-7229 (outside CA)
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For more information about ELHILL and the MED
LARS system, write to
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MEDLARS Management
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Bethesda, MD 20209

TELENET Communications, Inc.
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Vienna, VA 22180
800-336-0437

TYMNET Corporation
20665 Valley Green Dr.
Cupertino, CA 95014
408-446-7000

APPENDIX II

The following companies manufacture and market data terminals:

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521 Scharcot Ave.
San Jose, CA 95131

Applied Digital Data Systems, Inc.
100 Marcus Blvd.
Hauppauge, NY 11787

Beehive International
4910 Amelia Earhart Dr.
Salt Lake City, UT 84125

Computer Devices, Inc.
25 North Ave.
Burlington, MA 01803

Computer Transceiver Systems, Inc.
East 66 Midland Ave.
Paramus, NJ 07652

Data Terminals & Communications
P.O. Box 5583
San Jose, CA 95150

Digital Equipment Corp.
1 Iron Way
Marlboro, MA 10752

General Electric Co.
Data Communications Division
Waynesboro, VA 22980

Hazeltine Corp.
Greenlawn, NY 11740

Infoton, Inc.
Second Avenue
Burlington, MA 01830

Lear Seigler, Inc.
Electronic Instruments Division
714 North Brookhurst St.
Anaheim, CA 92803

LogAbax
10889 Wilshire Blvd.
Los Angeles, CA 90024

NCR Corp.
EDP Products
Dayton, OH 45409

Perkin-Elmer Data Systems
Terminal Products Business Unit
Randolph, NJ 07801

Research, Inc.
Data Systems Division
P.O. Box 24064
Minneapolis, MN 55424

Teletype Corporation
5555 Touhy Ave.
Skokie, IL 60076

Texas Instruments, Inc.
P.O. Box 1444
Houston, TX 77001

Trendata Computer Systems
610 Palomar Ave.
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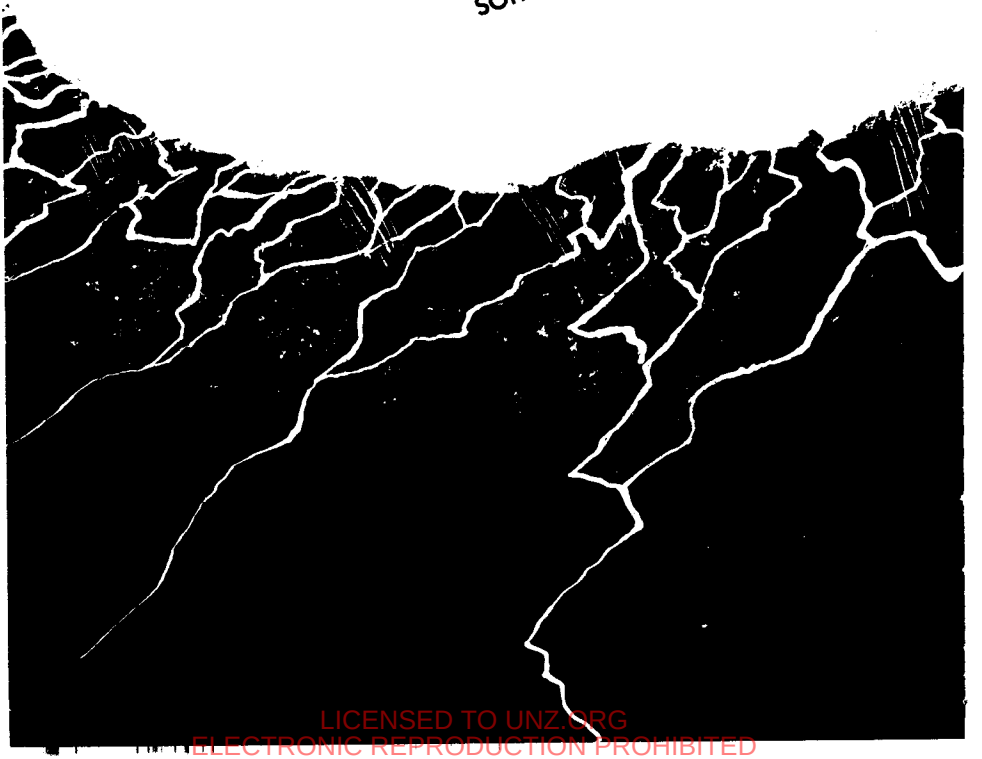
Michael A. Banks

THE TIE THAT BINDS

Honesty is the best policy—sometimes.



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I wasn't too surprised when the vague outline of a coffeepot appeared on the file cabinet across from my desk, although I did mumble a bit when it began to solidify. I'm used to witnessing logical improbabilities in my business and besides, I'd already figured that it must be Karl Epworth, playing around with holograms.

Damn nice holograms, too, from the looks of this one. I wondered if this was going to be another profit-maker; my business, you understand. I help inventors sell their ideas.

Nonchalantly, in case Epworth was somehow watching me, I got up from my desk and strolled over to the file cabinet. Even at close range, the coffeepot looked real. I smiled and reached out to run my hand through the image . . .

The coffeepot clattered to the floor when I touched it. I stopped smiling.

I bent over and picked it up, wondering if maybe I was hallucinating. It was real enough, all right. I looked it over carefully; as far as I could see, there was nothing unusual about it. Just a beat-up little coffeepot, scorched on the bottom from too much use, and empty.

The phone rang, and I dropped the coffeepot, zipped across the room, and grabbed the receiver.

"Hello?"

"John?" The voice sounded excited. "Karl here. Did the coffeepot arrive OK?"

"Arive . . . ? Yeah. Yeah, Karl, it's here. What—"

"Good! I was a little worried about the receptor focus. At this distance, if it —"

"What in the hell is going on?"

Epworth was silent for several seconds. "Oh," he said. "I didn't tell you, did I?"

"No," I replied. "Why don't you, ah, ill me in?"

"Well, I wanted to surprise you, John. The cleaning people let me in last night, and I set up the receptor then. You know the rest."

I mentally counted to ten and back to zero. Epworth has an annoying habit of assuming that everyone understands exactly what he is talking about—without his having explained anything. Sometimes I think that maybe he is telepathic and just naturally assumes everyone else is, also.

"Sorry, but I'm afraid that I *don't* know the rest, Karl. Let's start at the beginning: What's a receptor?"

Epworth laughed. "Actually, the receptor is the end. The transmitter is the beginning."

Everything snapped into place then. "Transmitter? Do you mean you *transmitted* the coffeepot here? Transmitted, as in matter transmitter?"

"Well, yes, though I prefer to use the word 'teleport'."

"I don't care what you call it, as long as it works! Which it obviously does. Can you bring the other half over here? I'd like to look it over."

He showed up, lugging two large suitcases, a half hour later. I helped him unpack some flimsy-looking rods and a couple of bread-boarded gadgets, and stood back while he carefully assembled the mess.

"Say," I said, remembering something, "where's the receptor?"

"Look in the file cabinet, top drawer.

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The receptor generates a collector field a few inches above itself, and placing it in the top drawer aligned the field at the surface of the cabinet's top."

"Tricky." I opened the drawer and found a cylinder about the size of a beer an.

Epworth finished assembling the transmitter. "Well," he said, "this is it." I looked it over. A latticework of quarter-inch copper rods rose out of each of the breadboards, which were set about three feet apart, and met to form a gently curving arch about six feet above the floor.

"So," I said, "what now?"

In answer, Epworth plugged a line from one of the breadboards into an extension cord he had run from a wall outlet. Then he picked up my telephone, unplugged it, and set it on the floor, centering it between the breadboards.

"Ready?" he asked, touching a small toggle switch set into one of the boards between the line cord and a transformer.

"Fire away."

He flipped the switch. There was a high-pitched whine, and the telephone began to shift in and out of focus. It was getting really hard to see a few seconds later, when it suddenly disappeared. There was a loud pop as, I assumed, air rushed in to fill the space the telephone had vacated.

I looked at the file cabinet. The telephone was sitting on top of it.

"Fantastic!" I clapped my hands in mock applause. "Is there any limit to how large an object you can teleport?" I was thinking of the anti-gravity device he had invented; that had worked, but only on a very small cale.

"No. We could run a semi-truck through the teleporter, if we constructed it properly."

He was obviously thinking along the same lines I was. This could revolutionize the transportation industry, and go another one of my projects one better. Another inventor, Cooper, had come up with the same effect recently, but in a different manner. *His* gadget didn't teleport matter, but instead brought two separate locations together, as it were, by creating an intra-dimensional "congruency."

There were two big drawbacks with Cooper's idea, though. First, when a congruency was established, we never knew where it was—it could be across the street, in the next state, or even (and this had happened) on the Moon. We had no way of telling where the congruencies would be established, not even in terms of how far away they might be, without setting them up and sending through a television camera.

To make matters worse, once a congruency was established, it had to be maintained by constantly moving objects between the two congruent points. You couldn't simply turn the "gate" on and off. We had solved that problem by running conveyor belts through the congruency, but it was something of a nuisance.

With Epworth's gadget, we could forget all of that. Oh, it would cost me some to drop the project, now that I was in partnership with Cooper, but I could stand that.

We spent the rest of the afternoon going over the possibilities and discussing the workings of the teleporter. Oddly enough, the teleporter's development was, according to Epworth, an

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outgrowth of his anti-gravity experiments. Something to do with the energy levels of electrons orbiting nuclei. But, where the anti-gravity device had been only a halfway success, the teleporter was obviously a complete success.

Or so I thought.

There really wasn't too much to do, as far as the groundwork was concerned, in setting up a teleportation service. Most of the problems we had solved already, thanks to the months I'd spent working with Cooper's device. The DOT and the unions had been mollified easily enough, mainly through a tentative agreement which would provide for the use of truckers and dockworkers as laborers at the congruency points. Besides, we wanted to set this up mainly for long-distance transport, which suited everyone just fine, thanks to the rising costs of fuel. It was just going to be a matter of establishing the proper congruencies, until now.

Now, we could dispense with the tedious process of establishing congruencies, and simply plug Epworth's teleporter into the system. Nice and neat. The only real problem would be public acceptance, something which I'd had plenty of experience with already, thanks to Epworth.

The whole thing fell in a week after Epworth's first demonstration. Cooper was in my office, hashing out a new partnership agreement with me, when it happened. He was just about to sign a contract our lawyers had flanged together when the coffeepot exploded.

At least, that's the best way to describe the event. Epworth says it wasn't quite that, but when something goes *kaboom* and takes out a ten-foot section of the wall, and the floor along with it, I call it an explosion.

Cooper and I picked ourselves up off the floor, unhurt but covered with plaster dust. Someone downstairs was yelling through the hole in the floor, and I could hear sirens. Probably the fire department, I thought. They were just a couple blocks away, on Linn Street.

There was a ringing in my ears, which turned out to be the telephone. I answered it. It was Epworth.

"John?" He sounded excited. I could imagine why.

"Yeah, Karl, the coffeepot exploded, and I'm not going to talk long because we also teleported the telephone. Come on over here—fast!"

He didn't waste time with small talk, as he usually does. He just promised he'd be over as fast as possible. I called the fire department and told them to send the bomb disposal truck.

I had a hard time convincing the bomb people that the telephone was due to explode soon after they arrived, especially since I was holding it when they arrived. But, between the hole in ghe wall and Epworth's sincerity, we got them to put it into the armored trailer they use to contain explosions.

It blew the trailer apart. *That* took a lot of explaining, and my insurance didn't cover it. Epworth took care of the explaining; my depleted bank account just barely took care of the bomb squad.

When the dust finally settled, I was left with no operating capital, no partner (Cooper), and no office. Epworth had calmed down the authorities easily enough, but I was a little confused over the cause of the explosion myself, mainly because of the fact that most of

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my information on it had come from the newspapers. The FBI, you see, had become quite interested in what could cause a telephone to turn into a bomb, and had hustled Epworth off shortly after he'd arrived at my office.

They lost interest, though, when they discovered that the "bomb" was at best an unreliable time bomb. They could do the same thing better and more precisely with what they had already. So much for a weaponry angle.

Thanks to the Feds, though, I didn't catch up with Epworth until a couple of weeks after the explosion. We met for lunch at a place out in the suburbs called Chester's, and he gave me the full story.

"The weak link in the system," he explained, "is the receptor. It doesn't reconstruct teleported matter exactly as it was before teleportation."

"I don't understand," I said, because I didn't. "The coffeepot *looked* OK, and the telephone . . . hell, it even worked for days afterward."

"That is because the difference is of the kind that we cannot measure directly, only by its effects. Certainly the matter was reproduced, but it was really a sort of 'quasi-matter'."

"Quasi-which?"

"Quasi-matter. It means 'not genuine, but resembling the real thing.' It's sort of like the difference between zircons and diamonds, or tacos from Taco Harry's and tacos from Hector's in Cozumel."

That reminded me, somehow, that I had a yen for some Irish coffee, so I ordered up one for each of us while he explained. I needed something to take the edge off all the food I'd consumed and, besides, Epworth was buying.

"What happens is that the electrons and their energy levels in the component atoms are not quite reproduced exactly. I don't know why this is, but it results in an increasing loss of binding energy which, at a certain point, results in turn in a release of *all* of the energy potential in the teleported matter."

That threw me. "Now, wait a minute. As I understand things, which is just barely, if you could release *all* of the energy in something the size and weight of, say, a telephone, it wouldn't just take out a wall; an energy release like that would have taken out at least several blocks!"

"No . . . well, yes, you are right, but this is a special case, John. Remember that not all of the energy is there. The quasi-matter is produced with much lower energy levels, and it bleeds energy for some time before the final release."

I thought about it, and got enough of a handle on it to realize that I probably didn't understand it all. But what I did understand was enough to worry me about one point.

"Where," I asked, "does the other energy *go?*"

Epworth looked blank. "Well, I hadn't thought of that. Not in that way. I suppose it is used up in the teleportation process, or it just dissipates along the way. I'm not sure, because I don't know *why* teleportation works—just *how*."

That made only a little sense, but I let it lie. It sounded like one of those problems that can only be explained with something esoteric like tensor calculus, not one of my strong areas.

But I did have a handle on it. "So," I said, "if I have this right, it's some-

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thing like when you have a lot of resistance on a long-distance telephone circuit; a lot of the energy is lost along the way, and you get a poor reproduction of the person's voice at the other end."

Epworth winced slightly. "Well, not really, but something like that. Actually, the problem has to do with the electron energy levels, as I was saying." He went on to explain, through two more Irish coffees, about someone named Schrödinger and his equations, and a lot of other stuff that I could pretend to understand only because of the fact that it takes an actor to survive in my line.

All of that was nice to hear about, but I was still left with my problems. I'd been able to pull things back together with Cooper, and we were back on line with setting up congruencies, but I was mighty damn short of cash. Cooper's gadget had cost me quite a bit when it had failed to be the ultimate trash disposal as we had planned, and I had been forced to pay damages to a landfill operator who had bought a setup from us. The congruency we had set up for them had been dumping garbage all over the state, and we were forced to shut it down before someone caught on to what was happening.

To top things off, here was Epworth with an impressive idea and nowhere to sell it. There had to be some angle, still . . .

Epworth was still talking. " . . . so, you see, the deterioration is only evident at the point where the interatomic bonds begin breaking down, except for the incidental heat energy preceding this stage.

"Anyway, it would make a hell of a trash-disposal system, hey?"

I kicked myself for not thinking of that, then mentally kicked myself again for thinking it would be a viable idea. After all, hadn't I just been burned by another "trash disposal"?

"Oh, no, Karl. No way!" I explained what had happened with Cooper's device.

Epworth settled back in his chair for a minute, thinking. Finally he said, "Cooper . . . I think I know him. Didn't he present a paper at the August ISIT convention?"

"ISIT?"

"Yes. The International Society of Intrinsic Technologists. Yes, I'm certain it was him. A rather large man with a beard?"

"Yeah."

"Right. We had quite a discussion following his presentation. It seems that he has hit upon a rather novel approach to the Unified Field Theory, in which . . . but, of course you wouldn't know about that?"

"No, I wouldn't. Anyway, you can see why the trash-disposal angle has no appeal for me."

"Oh, I don't know about that, John. Why don't you let me set up a demonstration model? I think that I can make this very appealing. In fact, I know I can. How would you feel about a system that not only disposes of wastes, but also generates usable energy?"

That got my attention. "Are you kidding? That would be great!" My apprehensions over the potential for this being a duplicate performance of Cooper's gadget were rapidly diminish-

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ing. Anything to do with energy was a hot item.

"You've got the answer, Karl. All we have to do is set this up as a waste-disposal system. Forget teleportation. We put the receptor in a big open field, maybe a mile from the transmitter, and shoot the garbage or whatever through. Then we move the receptor to another location in the field and shoot more garbage through, and move it back when the first pile of junk blows.

"I know just where to set up a demo, too. There's an outfit up in Ross, a landfill site . . ." I went on to explain to him about Cooper's gadget, and what had happened with that.

It took a hard sell, but I convinced the landfill operator to give us another chance. I had to wangle an option on some adjoining property for him to get him to sign, which says a lot about how much confidence he had in Epworth's gadget. If things worked out right, he wouldn't *need* to expand the landfill.

The only loose end left by the time we got the demonstration model of Epworth's teleporter-cum-garbage disposal set up was the matter of the lost energy.

No, not the energy released when the quasi-matter goes boom; Epworth and Cooper had worked out some sort of damper field to contain the energy release and slow it down to the point where reclaimable heat energy was generated.

The real problem was with the energy "lost" during teleportation. According to my observations and Epworth's explanations, a hell of a lot of the potential energy simply disappeared when an object was teleported, leaving the quasi-matter with a vastly diminished energy potential.

Epworth had absolutely no idea where the energy went. We'd heard of no unexplained explosions since he started experimenting with the teleporter, and there were certainly no visible effects attributable to the missing energy at either the transmitter or the receptor, nor anywhere in between.

We could make only vague conjectures which were little better than guesses. Of all the theories we came up with, my favorite was the idea that the energy somehow "bled off" during the teleportation process. I should have known better, though; the quantities of energy released from the teleported objects in transit couldn't just bleed off without a trace.

The system had been running a week before all hell broke loose. The crews had set up three receptor sites, and were using the third, since the first two had been used and wouldn't be re-used until after the quasi-matter garbage at each site had dissipated. Epworth and Cooper, of course, had installed two portable damper fields to contain the energy release, even though they weren't doing anything with the heat generated.

I was showing off the system to some officials from the two small towns in Clermont County which had contracted for Cooper's system. I'd spent the day before with them over in Batavia, the county seat, explaining the teleportation system which we were going to install in lieu of the congruency system.

Today, of course, we were touring the Ross landfill site. I had shown them the dissipating quasi-matter at the first

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two receptor sites, and was explaining the process of teleporting the garbage.

We—Epworth, the two officials, and I—were standing in front of the receptor area, watching tons of garbage materialize in a pit fifty feet deep and a hundred feet across. It was an impressive sight, and a good selling point, psychologically.

"So, gentlemen," I was saying, "after the pit is full, operations are suspended until the garbage dissipates. The dissipation process releases heat energy as a by-product, of course, and this can be reclaimed, as I explained yesterday. The potential is that the entire operation can be run as a self-sufficient system, with the heat energy being used to generate electricity to operate the physical plant."

Epworth had been nodding his head all along, providing an occasional supportive remark on cue. I glanced at him to give him yet another cue to take up the discussion, but he wasn't paying attention to me. He was walking closer to the pit, frowning and waving his hands in front of his face.

The two county reps were watching him, obviously wondering what was going on.

"Excuse me," I said, smiling, "I need to talk with Mr. Epworth for a moment while he's checking the system."

I walked to the edge of the pit and climbed down to where Epworth was by then. Right before I reached him, I felt a hot wind come up from the garbage in the pit.

"Karl, what's going on? You're making those guys nervous."

"What?" He half turned to face me. "Oh. Nothing. I was just concerned with the heat. I thought it was a chemical process, something like a slow burn, but it's not. Something has gone wrong."

I groaned. Not again. I was sure we had taken care of all possible problems on this one. And he was so nonchalant about it; that, from Epworth, meant that things were *bad*.

"Look," I said, "you can tell me later. I've got to keep the customers happy." I sprinted up out of the pit and back to my audience.

"Let's go back to the first site," I said, taking one of them by the arm. "I want to show you something else about the dissipation process."

"What about Mr. Epworth?" asked Zimmerman, the older of the two. He was squinting through what was obviously refraction caused by heat, watching Epworth darting around the pit.

"Oh . . . well, he's just checking some of the performance parameters. Nothing out of the ordinary; he just likes to keep on top of things." I started walking toward the first receptor site, a quarter mile away. "Now, as you'll see, the dissipation process at site number one is almost culminated, and . . ."

They left about ten minutes later, satisfied that nothing was wrong and that this was just the system they were interested in. I checked around the area of the third receptor site, but didn't find Epworth. He turned up in the second site, shere he'd turned off the damper field, and was standing on top of the garbage.

"What's up?" I asked. "Do you know what the problem is?"

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He stared at me while he lit up one of those little filtered cigars he smokes.

"John," he announced, after taking a few drags, "we're in trouble."

"I figured as much. What kind of trouble?"

"I'll tell you in a minute. First, let's get out of here and turn the damper field on again, before this mess blows."

We did that, and adjourned to the relative privacy of my car. I turned on the engine to run the air conditioning, since it was one of those hot August days, and my sinuses were killing me.

Settling back with another cigar, Karl said, "Did you notice how hot it was, back there at the third pit?"

"Yeah, but it's hotter than hell outside, anyway, and I didn't see any fire or smoke. What's up?"

"I wish I knew. The second pit wasn't that hot, nor was the first, even though the damper field was causing them both to generate a good deal of heat." He pulled a small thermometer from his shirt pocket and tapped it on the dash. "According to this, the outside temperature is ninety-eight. The temperature on the surface of the garbage in pit one and pit two is something in the neighborhood of one hundred fifty, with the damper fields on. With them off, it rises to one eighty.

"That's fine, and as it should be. The real problem is with number three. Twenty minutes ago, the temperature there was two hundred, and five minutes ago it had risen to two-twenty." He waved the thermometer for emphasis. "It's probably hitting two-fifty now, I don't know. This thermometer only reads to two-twenty."

"What does it mean?"

"It means that I don't know what is happening, nor why. Something is definitely wrong, though, and it has me worried. There is no way that the quasi-matter could dissipate this quickly, but the fact remains that it is. It's as if it were under the influence of a damper field, which it is not, of course."

I allowed as how that was a bit of a problem. "What are you going to do about it?"

"Well, for starters, I'm going to call Cooper and have him bring up some test equipment. It will take him a while to get it together and drive here from Florence, though, so you'd better start getting those workers away from the pit, and tell Chaney something to stall him. I don't imagine he is going to be too happy about this system fouling up, too."

Fortunately for me, Chaney, the owner, was gone for the day, so I could put off that confrontation. Cooper showed up about an hour later, with a truckload of equipment which he and Epworth promptly began setting up. By the time they finished, the place looked like a mad scientist's dream, with mysterious-looking boxes and wires everywhere.

It was starting to get dark by then, and I noticed a blue glow around the garbage in the pit. It had also become noticeably hotter in the vicinity. Epworth claimed a temperature reading of four hundred degrees Fahrenheit, but I would have sworn it was twice that.

On top of everything else, the mess was beginning to stink. Not surprising, considering that tons of miscellaneous garbage were being slowly heated to combustion.

It did start burning, eventually, and

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we watched the orange glow fade in and out as the smoke obscured it. I started worrying even more then, because the ground around the pit was starting to get hot, too hot to stand on for very long.

Epworth and Cooper continued to dart around the equipment, scribbling on pads and entering data into a pocket computer that Cooper had brought along. I helped set up some portable floodlights, so as not to feel completely useless. About ten in the evening, Cooper and Epworth went into conference in the landfill office, then came out and sent everyone home.

Without stopping to talk to me, they raced over to the first pit and began tearing down the generator and perimeter posts for the damper field. It was getting hotter at the third pit—the ground was beginning to crack around the edges—so I walked over and held a flashlight on them.

"What's going on now?" I asked. It was a silly question to be asking them, intent as they were on what they were doing, but I was ready to burst with curiosity.

"We'll explain in a few minutes," Cooper said without looking up from the connections he was working on. "We can't waste any time!"

Without being asked, I lugged the generator box over to the third pit, and watched while they set up the damper field. We had set up the system with only two dampers, on the theory that at any one time only two receptor sites would have dissipating garbage in them.

When they'd finished setting up the field, Cooper connected it to a power supply and sat down on the ground, sweating. "That was close," he said, wiping his forehead with an already soaked handkerchief.

Epworth walked around the perimeter of the field, checked some instruments, and announced, "Close to a thousand degrees in there; the increase must be exponential! It's a good thing we figured it out when we did."

"Figured what out?"

They both stared at me as if I were an intrusive child. Then Epworth said, "The energy, John. We found the missing energy; it was just a little out of synch with the teleported matter."

"Do you mean that this is the energy that didn't . . . that wasn't . . ." I stopped to collect my thoughts. "Is this due to the energy that was lost during the matter transmission process?"

Cooper and Epworth exchanged glances. "In a way," Epworth answered. "It is rather difficult to explain . . . " He frowned, then went on, "Remember the idea you had that this energy loss was similar to the energy loss experienced when electricity flows through miles of high-resistance wire, as with a long-distance telephone hookup?"

"Yes. Some of the energy is lost as heat, due to the electrons pushing to overcome the resistance, right?" I was pushing my high-school physics to the limit, but it sounded right.

"Yes, that's close enough. What we have here is somewhat analogous to that situation, with one difference. Here, the energy is being routed back to us. It's as if the lost energy in your wire had merely been stored until the storage capacity had been reached, and now it is going to ground."

"Do you mean like in a capacitor?"

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"Yes, you could say that. The energy storage has reached its maximum potential, and now is being discharged, to 'ground', as it were; the receptor is the 'ground'."

Cooper stood up. "The energy has been discharging for some time, actually, but it was a slow process in the beginning, so we didn't notice it as the quasi-matter dissipated. Now, however, the potential of the stored energy is much greater, since several hundred tons of matter have been teleported. The *rate* of discharge *is* decreasing exponentially, as does that of a capacitor, but, again, the 'charge,' so to speak, is much greater than it has been previously."

"The analogy of the capacitor doesn't quite hold true all the way through," Epworth added, "but it's close enough. I imagine that, without the proper damping field to regulate the discharge, we would get all of the energy in one tremendous burst, just like a capacitive discharge."

Cooper stood up. "Hey! Think of all the heat we're generating here. Why, with a little work, we could set up a steam-powered generator, and—"

"Hold it!" I didn't quite shout it, but my nerves were about shot. "No more bright ideas, please. Look where this one has gotten us, will you? I've sold this outfit two defective systems, one of which is currently operating in violation of a dozen local ordinances, and both of which turn out to be not what we thought they were! I'm *not* going to go through this scene again with you guys; I can't take it, and neither can my bank account!"

"But, John—" Cooper began.

"No!" I was really warming to the topic. "No more tinkering from you. You led me on with these gadgets, and got me to believing that we could make some money with them, and I do nothing but spend money with no return. What's to say that whatever you're about to tell me will be any different?"

"We made money on the anti-gravity device," Epworth said quietly.

"Hah!" I replied. "That didn't work right, either, Karl, and you know it. I had to disguise it as something else to even sell it to a few people, and that was more luck than anything else."

"That's not what you said at the time, John. Anyway, Russ is right; there has to be a hell of a markek for *any* new energy source, and we're sitting on top of a really hot idea."

I ignored his unintentional pun; Cooper chuckled. "Goodnight," I said.

I walked toward my car, turned for a moment and watched them, backlighted by the blue glow which was starting to come up again. Apparently they hadn't heard me; they were engaged in animated conversation. I shrugged my shoulders, climbed in the car, and left.

I followed the advice of my attorney and stayed away from the office for the next few days. In the meantime, she studied the situation, and determined that I owed Chaney, the landfill owner, full repayment of all monies I'd received from him and, worse still, he could probably sue me for damages and win. *Me:* we hadn't incorporated the partnership formed to handle the matter transmitter. I figured that Epworth and

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Cooper would be equally liable, but that didn't make me feel any better.

I heard nothing from Epworth or Cooper, nor did I try to contact either of them until after the dust settled. When I finally did try reaching them, they coulnd't be found, although my attorney assured me that she had met with both of them and had set up some kind of an escrow account for them to handle the money due Chaney.

About five weeks after the incident at the landfill, I found a postcard from Epworth in the mail at my house. The message was brief: he wanted me to meet him and Cooper at an old farm that Cooper owned out past Goshen, a little town in the next county.

That was smart; he knew that I would be curious as hell as to what he might be up to, and I was. The day he'd set for the meeting saw me heading out of Cincinnati bright and early.

The "farm" was actually nothing more than a gutted frame house and a forlorn-looking barn in the middle of a twenty-five-acre tract. The old gravel road leading up to the place was winding, and the going was slow, so I couldn't see anything but trees until I rounded the last turn before the farmhouse.

I stopped the car behind Epworth's old junker, got out, and looked around. There was nothing to see, so I walked up over the hill behind the house. Then I saw Cooper and Epworth, down in a little gully, standing next to something that looked like a cross between a small silo and a quonset hut. In fact, it turned out that the structure *was* a small quonset hut, with the domed top of a silo mounted on its roof.

"Morning!" Epworth hailed me. "Come on down."

I strolled down the hillside to them, shook hands, and said, "What's up?"

"Something we think you'll like," Cooper replied. "We did a little more work on the heat recovery problem, and this is the result." He waved one arm at the quonset-silo structure.

"So?" I said. "I told you guys what I thought of your bright ideas. You know how much trouble we're in already because of these gadgets."

Cooper said, "Yeah, but I think you'll agree that *this* is the answer to those problems."

"Well," I asked, "what is it?" I knew that I should have been raising hell with them over the money and all the other problems, but these two closet geniuses did have a lot on the ball. Besides, it wasn't exactly their fault that things had screwed up so badly; any new system has to be debugged.

"Remember all the heat that the missing energy generated?" Cooper asked.

"Yeah, what about it? You've figured a way to collect it, right?"

"Right!"

"Well, forget it," I said. "How are we going to sell something this strange? Will you tell me that? How are you going to get people to buy something that they can't understand, and looks like magic?"

"Easy," Cooper answered. "Just mention the cost of energy, and talk about the upcoming shortages."

"And," Epworth chipped in, "they will understand it."

"How's that," I asked, trying to hold back the sarcasm, "when *you* don't really understand it?"

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"Oh, we know enough about the system now, just because of the fact that it has been in operation long enough for us to observe all possible effects of its operation. After all, we know what happens to the matter transmitted, and the energy lost along the way."

"Yeah." I was still skeptical, of course. "Sure. But, you don't know *where* the missing energy is before it returns to the receptor! For all I know, it could be doing expensive damage somewhere, and we won't know about it until it's too late!"

Epworth glanced at Cooper, who shrugged his shoulders and said, "John, the energy doesn't *go* anywhere."

"Huh? But you said—"

"I know, I know. The terms we've been using—'missing,' and so forth—are just convenient for expressing an analogy. What really happens can only be described mathematically, but a truer description of the effect of the so-called 'returning' energy would be that the energy level of the component atoms of the transmitted matter is stabilizing. The quasi-matter can't remain stable during this process, so the binding energy of those atoms is released. It has a lot to do with entropy. If you'd like, I can show you—"

"Oh, no! I mean, that's OK, Russ. All of that is a little too deep for me; I'll just take your word for it all."

"Anyway," Epworth chipped in, "how do you like it?"

"Like what? You still haven't told me what you've done to solve our problems here."

"The whole system, John! Look at it: we transmit garbage or whatever, and use the heat generated by the stabilizing quasi-matter to generate electricity by way of a steam turbine. Simple, yes?"

"Yes, but you still haven't told me how I'm going to sell this thing."

"Well, I thought you would have it figured out by now. The answer is obvious."

Obvious to him, but not to me. As usual, he wasn't bothering to explain things. "OK, I give up; what's the gimmick?"

"Geothermal power," he said smugly, as if that was all there was to say about it.

"Geothermal . . . ? But what has that got to do with matter transmitters?"

"Everything, on the surface. Remember your gimmick for the anti-gravity device?"

"Yes." I had almost lost everything on that one, too, before I'd pulled it out of the fire by marketing the gadgets to people who *wanted* to believe that such a thing as anti-gravity was possible, as opposed to those who were skeptical and wanted to know how it worked. Most people, you see, couldn't accept an entirely new principle, especially one so radical. When I tried selling the gadget, my potential customers wouldn't even discuss it unless I could explain it in terms of what they knew to be possible—magnetism, or whatever.

I ended up marketing the anti-gravity gadget through little ads in the backs of magazines commonly read by people who are into new ideas, no matter how nutty they are. (The ideas, I mean; not the people, though the term might apply to some of them, too.)

Eventually, someone caught on to the fact that the gadgets were for real, and

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a research firm bought the rights to the principle.

Still, I couldn't see how that would apply here. I knew that we couldn't advertise this system to the public, certainly not as a geothermal energy system, and I told Epworth that.

"Right, John, but that's not what we have in mind. As you may recall, you told me the reason you went the classified-ad route with the anti-gravity device was because people would accept the device if it was presented in a familiar manner."

"Yes, and that *is* true, you know. Look at cars, for instance. When the first automobiles were introduced, the public took to calling them 'horseless carriages,' because the term equated automobiles with something familiar."

"And you still don't see what that has to do with this?"

"No, Karl, I don't. Why don't you tell me?"

"I'm surprised, John; I thought you more intelligent than that." He sighed. "Well, here it is. We set up transmitters and receptors in structures like these," he indicated the quonset/silo, "along with the heat recovery and generating systems.Two or three of them should be enough. Then, we bill them as geothermal energy laboratories, and let your science writer contacts snoop around and give us publicity. *Then,* we apply for DOE research money."

"Fine," I said, "but what happens when someone actually wants to buy one of these systems, and finds that he doesn't have to drill holes in the ground, and that the system will work anywhere?" I had visions of fraud suits, and then it hit me; that was exactly what we wanted to happen. It would be just like the anti-gravity device; people would accept it as something familiar, and when they discovered that it was something far stranger than they could imagine, more "new" than the concept of geothermal energy, well, they would already be hooked on it.

It didn't take long to start the wheels turning. My tech-writer contacts took the bait, hook, line, and sinker. Epworth and Cooper worked up a complicated scam about temperature gradients in the subsoil, and padded it with talk about a new kind of heat pump. It worked, though a few people were suspicious. Still, those few skeptics couldn't doubt the evidence in front of them—a heat source which, thanks to Epworth and Cooper's gadgetry, depended on no outside energy and apparently *was* the shaft drilled beneath the quonset.

Someone will catch on to us sooner or later, someone who thinks like Epworth, probably, and the cat will be out of the bag. By then, though, the system will have been proven and accepted by the public, thanks to the popular scientific press.

Stories have already appeared in the local papers, and the national magazine coverage will hit in a few months. It's going to take time, but eventually most everyone will be dumping his garbage into a little building in the back yard, and getting free energy in return.

If the power companies don't get in the way. I don't think they will; the change is going to be gradual, and the system isn't really practical for large-scale consumers of electricity, such as factories. A really large system, you

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see, has some very dangerous aspects. Besides, most all of the power companies would welcome some relief from their load. Still, you might want to keep an eye on the energy issues on the stock market.

In the meantime, I'm already realizing some benefit from the concept. The second prototype generating system is set up in *my* backyard, and that means one less little envelope in my mailbox each month—and it takes care of the junk mail, too. ■

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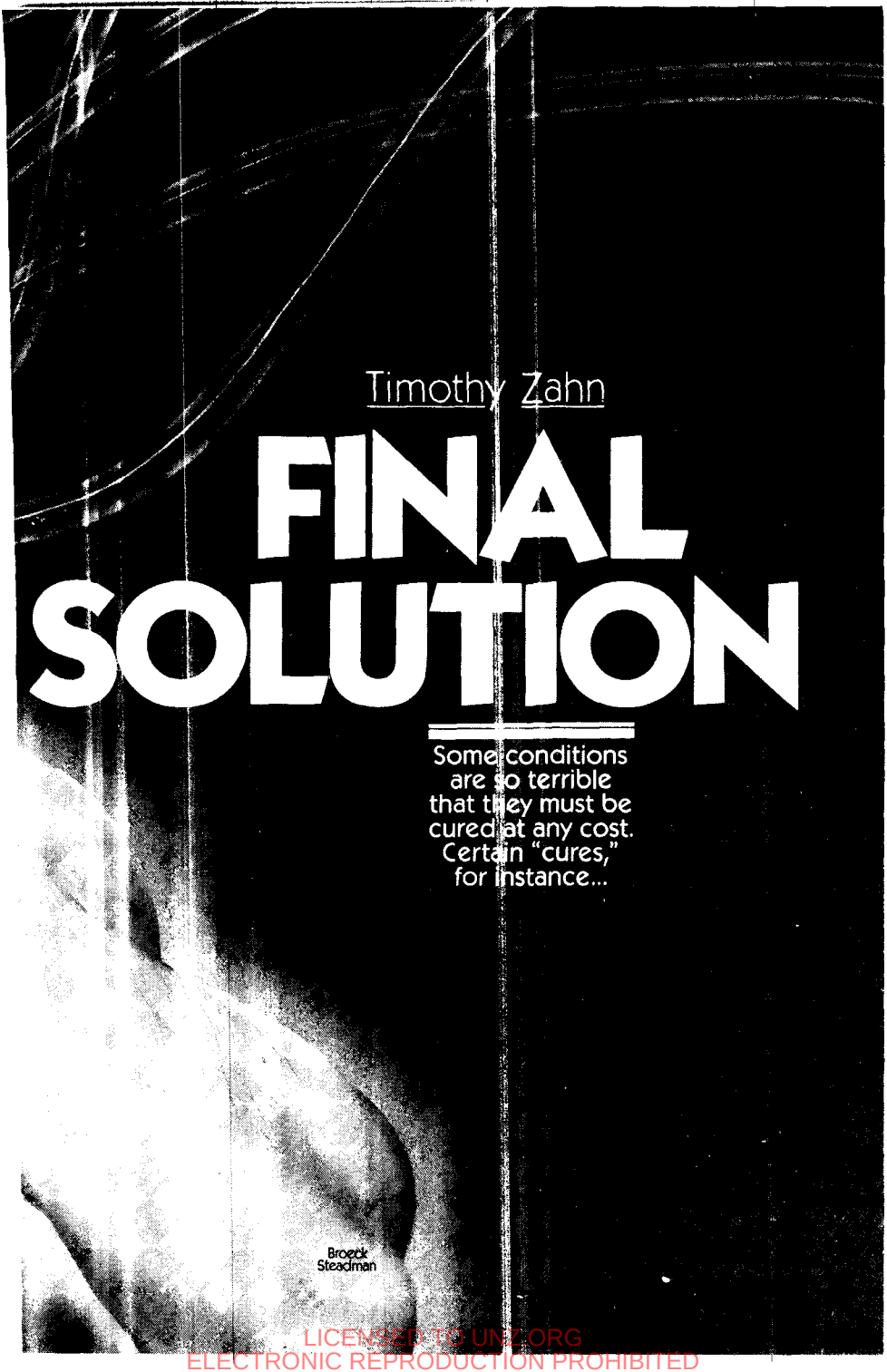
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FINAL SOLUTION
Some conditions are so terrible that they must be cured at any cost. Certain "cures," for instance...
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Narda Jalal had finished her solitary dinner and was starting to load the dishes into the sonic cleaner when the kitchen radio reached its five-thirty timer setting and switched on.

" . . . ive-thirty world news survey. The Hasar Council of Ministers has officially rejected the demand by the Lorikhan Nation that the minerals of the Enhoav Basin be divided evenly among all the nations of Kohinoor. Supreme Minister Zagro has said repeatedly that, since Hasar provided ninety percent of the technology and funding used to crack the mantle fault three years ago, the bulk of the project's rewards should be ours. Lorikhan's threat of war over this issue is dismissed by the government as mere bluff. The Prima of Missai, meanwhile, has offered his nation's good services as mediator—"

"Radio control: off," Narda called. Obediently, the radio fell silent. Brushing a strand of hair from her face, Narda stared through the dishes by the sink, her teeth clenched with abnormal tightness. So that was it. Three years of negotiation had ended without anyone budging a single centimeter, and once more the threat of war hung like a weapons satellite over Kohinoor, circling and waiting to drop. And this time it wouldn't be just a local flare-up over borders or water rights. The Enhoav Basin, that tremendous treasure house of minerals torn forcibly from Kohinoor's molten insides, was a potential Juggernaut in a world economy where even copper was selling for over a hundred ryal per kilo. For the riches of Enhoav all the nations would fight. *All* of them.

"Oh, God, please," Narda half-groaned, half-prayed. "Not another world war. Please."

It seemed impossible to her that a single world could have so much war, especially a world with Kohinoor's history. Its founders had left Earth for the express purpose of *escaping* warfare and conflict. They'd been men and women of peace, if the history disks could be believed; visionaries who believed there was a better way. What had gone wrong?

A motion across the street caught her eye. Looking through the window, she saw their neighbor Mehlid step from his door, easel and paints in tow, and head toward the row of hills a few hundred meters behind his house. He was a large man, surprisingly well-built for an artist. Narda watched him as he walked away, thinking of the long, sensitive fingers that seemed so out of place with those broad shoulders—

With a sharp shake of her head she tore her eyes away, a hot rush of guilt flooding her face with blood. She had never been unfaithful to her husband, and she knew with absolute certainty that she never would. Why then did she find herself watching Mehlid so often, and with such interest? It was wrong —wrong and uncomfortably juvenile —and yet she couldn't stop.

A surge of anger flowed in to cover the guilt. It was Pahli's fault, she told herself blackly; Pahli's and the military's. If they would just let the *Susa* stay on patrol around Kohinoor instead of sending it out on so many deep-space surveys, she would have a man around the house more often. Pahli didn't *have* to keep accepting these assignments, either.

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No. She was being unfair, and she knew it. At least some of the tension on Kohinoor was due to the lack of new frontiers, to the general feeling that there was nowhere else to go. None of the other twenty-eight bodies in Kohinoor's system was habitable, and the grand experiment with orbiting space colonies had been horribly and tragically ended two wars ago. If Pahli and his crew ever found a suitable world out there, the results would be well worth one woman's minor inconvenience. On the heels of that thought came another, more sobering one: if world war broke out the first battles would be fought in space . . . and even small ships like the *Susa* would be prime targets.

With an effort, Narda pushed her fears from her mind. The news survey would be over now, and some music would help her mood. "Radio control: on," she called. She was in luck; they were playing something soft and peaceful. Picking up one of the dirty dishes, she sent an involuntary glance through the window. Good; Mehlid was out of sight. He was easy to ignore when not visible. Placing the dish in the cleaner's rack, she thought about Pahli. What was he doing now, she wondered . . . and was he thinking of her?

Pahli Jalal's thoughts were, in fact, a dozen light-years from his wife. Specifically, they were on the massive object some fifty thousand kilometers off the *Susa*'s starboard bow.

"No chance that it belongs to Lorikhan or any of the others, is there?" he asked Ahmar, his aide, as he studied the image on the telescope screens.

"None, sir." Peering at his bank of displays, Ahmar touched a button and then shook his head. "Completely unknown configuration and space-normal drive spectrum. Scanner Section reports their star drive probably works on the same principles as ours, but it's definitely not a standard Burke system." He glanced at the commander. "Are we going to make contact?"

Before Pahli could answer, the helmsman spoke up. "Commander, it's changing course—coming toward us!"

"Looks like the decision's been made," Pahli said to Ahmar.

"We could attack, sir, or even run," First Officer Cyrilis pointed out. "Or both; we could fire a torpedo salvo and be gone before they even knew the missiles were on the way."

Pahli and Ahmar exchanged glances, and Pahli felt his jaw tighten momentarily. Fight or run—it was always the same reaction to every problem. When, he wondered, would humanity learn to solve conflicts with understanding and mutual respect instead of with animal reflexes? "Recommendation noted, Lieutenant. We'll hold orbit here and see what they want."

"Yes, sir. Recommend we put weapons stations on full alert anyway, Commander. Just in case."

Eyes still on the screens, Pahli waved an impatient hand. "All right. See to it."

Cyrilis saluted and floated across to the main intercom board. *Sotto voce*, Ahmar said, "I hope he doesn't blow them out of the sky before they even have a chance to say hello."

Pahli shrugged. "I wouldn't worry about that. He's got better combat nerves than either of us."

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"Commander!" the scanner chief reported suddenly. "UV laser hitting us; coming from the other ship. Low-power, too diffuse to be a weapon. It seems to be frequency-modulated."

Pahli threw a tight smile at Ahmar. "I think they've said hello. Get a recorder on that laser and turn Cryptography's computers loose on it. I think there's also a package of basic language instruction on file, isn't there?"

Ahmar nodded. "Disk File Ninety-three something, for opening communication in case another Earth ship ever came out here."

"Start beaming it across with one of our own communication lasers. It'll prove we're interested in talking, even if they can't understand any of the tape."

The unknown ship took up a parallel course some five hundred kilometers from the *Susa*; and for six hours the two ships did a slow promenade as the lasers continued their information exchange. And it was the unknown, not the *Susa*, that solved its puzzle first.

"I greet you, Human," the bridge speaker boomed out in a voice like flat gray paint. "I am called Drymnu."

The words seemed to echo through Pahli's head. It was indeed as he'd half-expected: no tenth-generation human ship, but a truly alien craft. Kohinoor's first contact with another race . . . With as much poise as he could manage, he touched the proper button on his board. "Drymnu ship, greetings," he said, his mouth dry. "This is Commander Pahli Jalal of the starship *Susa*, servant to the Hasar Nation. Have I the privilege of addressing your captain?"

"This concept is one of many I do not understand," came the reply. "Your language does not follow a familiar pattern, and I am surely making grave errors in my interpretation."

The alien's abruptness took Pahli aback somewhat. "Well, we'll be happy to assist as much as possible," he said, motioning to Ahmar. The aide had anticipated him, and was already tying Cryptography into the conversation. "Please explain the problem."

"First, I appear to have found more than one way to address you: *Human, Commander Pahli Jalal*, and *Hasar Nation*. Which is correct, or do I misread? In a congruent manner, which ref erence word is correct: *you, him,* or *her?* And how do *I* and *we* correspond?"

Pahli frowned. "All the words are correct in different contexts. 'You' refers to a person being addressed or spoken to, while 'him' and 'her' are used when speaking of a third person."

There was a pause as the other seemed to digest that. "But does third person not refer to a separate entity not part of oneself? Surely there is insufficient space in your craft for two of you to exist."

Pahli cut himself out of the circuit and turned to Cyrilis, who was peering over the scanner chief's shoulder. "Just how big *is* this alien, anyway?" he asked.

The other hunched his shoulders. "Several thousand of us could fit comfortably aboard that ship. He can't be *that* big—square-cube laws would never have let him evolve. We've got to be misunderstanding him."

Pahli nodded and touched the switch again. "We also seem to be misreading," he said. "We are all of one *spe-*

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cies, but there are over one hundred eighty *persons* aboard this craft. Does that help?''

''This is not po*sheliz-scsit-khe-fzeee*—'' The speaker squealed unintelligibly for a second and then cut off sharply.

''What was *that?*'' Ahmar whispered.

''I don't know. I must have said something wrong,'' Pahli answered. ''Cyrilis, put all defense systems on full alert.'' The other nodded, and a tense silence descended on the bridge.

When the break came it was almost an anticlimax. ''You are a fragmented race,'' the speaker said, once again in a flat monotone. ''Each of your members is distinct from the others. Is this true?''

A strange shiver ran down Pahli's spine. The implications of such a question . . . ''Yes, that's true. I, uh, take it you're different?''

''I am one. Aboard this craft is a single mind, a single purpose, with eighteen thousand two hundred twenty-six physiologically distinct units. Never before has a fragmented race survived its intraspecies warfare to reach the stars. That has always been impossible. Where are you from, and how have you accomplished this?''

A surrealistic picture flashed across Pahli's mind: the alien ship transformed into a giant beehive, its corridors filled with buzzing insects. He shook the vision out of his mind and again cut off the link. ''Ahmar, do we have a mistranslation here?''

''Doesn't look like it, sir. Cryptography reports that the grammatical structure of the Drymnu language seems compatible with this sort of hive mind thing they're describing.'' He shook his head. ''A hive mind. I've read about such things, but only in fiction. To actually *find* one . . . '' He trailed off, still shaking his head.

''Commander,'' Cyrilis called from across the bridge, ''the Drymnu's last question is a potentially dangerous one. I don't think we should tell them —it—anything about Kohinoor.''

Pahli nodded slowly. That burst of emotion when the alien realized the nature of humanity could have been surprise, fear, or hatred. Best to err on the cautious side. ''No problem. I'll tell him about Earth. Even if he could find it, it's too far away to bother with.'' If it hadn't blown itself out of existence by now and saved any hostile aliens the trouble, he added silently. On Earth, even more than on Kohinoor, problems were solved with animal reflexes.

Thumbing the switch, he settled more comfortably into his chair and began telling the strange creature called Drymnu about the equally strange creature called Man.

The sun was just setting behind the tall buildings of Missai Gem when the formation of six fighter jets streaked by overhead, heading south toward the Missai-Baijan border. A handful of grain still clutched in his hand, Shapur Nain looked up as they were briefly framed by the city park's trees. He twisted his head to follow them with his eyes, feeling the initial tension drain from his old body. Only a single wing, and not climbing with anything near attack speed, unless his eyes were failing as fast as his legs. That meant it was

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only a routine patrol, or perhaps that the border forces were being beefed up. The war with Baijan hadn't started. Not yet, anyway.

He watched the jets vanish into the distance and then turned back to the birds and small animals milling around his bench. Tossing them the grain, he watched with interest as members of the different species jockeyed for position. The scavenger rusinh, armed with needle-sharp ridges on beak and wing coverts, had all the obvious physical advantages over the relatively defenseless treemice. To compensate, the furry mammals had developed a strategy where two of them would distract a rusinh with lightning-fast feints while a third made off with some of the grain. Each threesome worked in rotation, giving all its members a chance at the food.

Cooperation—that was the secret of survival. Tossing out another handful, Shapur wondered if mankind would ever learn that lesson. He tended to doubt it. Kohinoor had started with the cleanest sheet humanity had ever had—and what had they done with it? The legends said Earth had been worse, but Shapur no longer really believed that. Three wars in his lifetime alone, including one world war . . . his left leg throbbed with the memory. And now this Enhoav Basin problem could close the books on the whole thing permanently. Emotions and rhetoric were running high and hot, especially between Hasar and Lorikhan, and there were no signs that either side was ready to back down.

Shapur shook his head in frustration. Even he, who'd been pretty well cured of foolish nationalistic sentiments by his wartime experiences, had found himself being caught up by the polarizing forces around him. Logically, he could agree that Hasar was entitled to the rewards of its billion-ryal gamble—but the Hasarans were so damned *insolent* about it! And as for Missai playing mediator, that was laughable in the extreme. With the water-rights issue at the southern border on the verge of boiling over again, Prima Simin had little credibility as a peacemaker even among his own people, let alone the rest of Kohinoor.

The shadows of evening had fallen across him, and Shapur shivered with the sudden chill. His bag of grain was nearly empty now; scattering the remaining kernels, he waited until the birds and animals had finished their feeding. Then, grasping the cane that rested against the bench beside him, he got carefully to his feet. For a moment he stood there, waiting stoically for the sudden agony in his leg to subside. Then, keeping the use of the cane to a minimum, he began the slow walk to the edge of the park and his apartment a block away. Someday, he thought, they'd come up with a genuine pain-regulating prosthesis and he wouldn't have to go through this every time he wanted to stand up.

Glancing south, he again shivered. Prosthesis research was always strong during wars.

The preliminary reports were all in, and most of the senior officers had left the *Susa*'s briefing room to continue their work. Only First Officer Cyrilis remained behind, seated quietly at the small table. "Something else on your mind?" Pahli asked, collecting the re-

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port disks into a neat pile in front of him.

"Yes, sir, I want to know why you refused my suggestion earlier that we disable the alien ship when we had the chance. We had the drive units pinpointed; a single seeker torpedo in each would have—"

"Would have been a totally unwarranted act of aggression," Pahli interrupted him stiffly. "What did you want to do, start an interplanetary war? Don't we have enough trouble on Kohinoor as it is?"

"It's precisely because of our problems on Kohinoor that I made the suggestion. It may or may not have occurred to you, Commander, but the Drymnu ship presents us with a rare opportunity. Even a partial mastery of an alien technology could give the Hasar Nation a vital military edge over our enemies."

"I don't recall the Drymnu offering us any of their technology. In fact, it seemed to me that they were inordinately eager to get away from us, and weren't in any mood to open trade relations."

Cyrilis shook his head impatiently. "I wasn't suggesting we beg or barter for the items we could use."

"I know what you were suggesting. Ignoring the moral issue for a moment, suppose we'd attacked and found them better armed than we thought?"

"The *Susa*'s a warship. It's our job to take risks when necessary."

Pahli was suddenly tired of this conversation. "Well, the subject's academic now, anyway. The Drymnu's gone, and we can't follow him."

"Yes, we can." Standing up, Cyrilis walked over to Pahli, moving with practiced ease in the tenth-gee the *Susa*'s rotation was providing. "I took the liberty of launching two sensor drones a few hours before the alien left. We got his para-Cerenkov rainbow from three directions." He handed Pahli a disk. "Here are his course and speed figures."

Pahli took the disk mechanically, looking up at the lieutenant with new eyes. To do something like that without Pahli's permission skated uncomfortably close to insubordination.

"I'd guess we have no more than a couple of hours to give chase before he gets too far ahead of us," Cyrilis continued. For a moment he locked eyes with his commander. "The decision is yours, of course. I trust you won't take too long about it." Saluting, he left the room.

Pahli was still seated at the table, fingering the disk, when Ahmar came in. "I just saw Lieutenant Cyrilis heading toward the bridge, looking like an angry jinn. What did you say to him?"

Pahli brought his gaze back from infinity and focused on his aide. "Actually, he did most of the talking. He thinks we should go after the Drymnu, blow him to bits, and then take any of his equipment that's still in one piece."

Ahmar shook his head. "Thank God he's not in charge. And how does he expect to find the Drymnu again? It's a big universe, you know."

"Not big enough." Pahli displayed the disk. "He got the specs for the Drymnu's first flight segment."

Ahmar blinked in surprise. "Did you authorize that, sir?"

"Of course not." Pahli tossed the disk onto the table. "Unfortunately,

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he's got a good point. Command *will* want to know why we didn't at least try to barter for some of the Drymnu's technology."

"And why didn't you?"

"Same reason Cyrilis wants the stuff, only in reverse. Kohinoor's poised on a knife edge already. I don't want to be the one to push it off by introducing more weapons into the equation."

Ahmar nodded agreement. "But I suppose rational thought like that would be lost on a fire-breather like the lieutenant."

"Oh, don't be too hard on him. He's a man of war, and from his viewpoint I probably *am* an inferior commander. On top of that, I suspect he's suddenly realized why the *Susa* spends so much time away on these planetary search missions."

Ahmar cocked his head slightly. "Because you're a man of peace?"

Pahli grimaced. "I'm sure Command thinks more in terms of 'lost nerve.' But you're right; I don't think they really trust me too close to the Kohinoor war zone. Cyrilis probably thinks serving under me will reflect badly on his record because of that."

For a moment Ahmar was silent. Then, nodding at the disk, he asked, "So what are you going to do?"

Slowly, Pahli picked up the disk. "I've been thinking, Ahmar. Maybe Cyrilis is right—maybe the Drymnu *does* have something we can use back on Kohinoor. I think we should have another talk together."

Ahmar's jaw sagged slightly. "You're not *serious*. Commander, you don't have to give in to any of this pressure—"

"No, my mind's made up." Abruptly, Pahli got to his feet and handed his aide the disk. "Take this to the bridge and feed the data into the helm. Cyrilis will be up there; tell him to kill the spin and secure for hyperspace. I want the Burke drive firing in fifteen minutes."

Ahmar tried twice before he could get the words out. "As you command, sir." He backed a few steps toward the door, his eyes never leaving Pahli's face. "Sir, are you sure—?"

"Fifteen minutes."

Turning, Ahmar fled the room.

Pahli permitted himself a tight smile as he moved more leisurely toward the door. So Cyrilis wanted technological treasures from the Drymnu, did he? Well, perhaps he would get more treasure than he'd bargained for. A *lot* more.

Flat on his stomach in the dirt, Ruhl Tras poked his head cautiously over the crest of his hill. "There they are!" he whispered to the crop-haired girl beside him. "Must be a zillion Hasar-devils out there!"

"You think we got enough soldiers?" she whispered back, raising the snout of her Flash-Back rifle to point at the imaginary army below.

"Sure," he told her confidently as he brought his own weapon to bear. His wasn't nearly as neat as hers—it was at least two years old and the batteries were running low—but his initial embarrassment over it always disappeared once the game got going. Raising his head higher, he looked to either side and gave the signal. Instantly the hills erupted with a cacophony of whistles, screams, and clicks as a half dozen different guns

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began going off, accompanied by enthusiastic shouts and yells. Jumping to his feet, his own machine gun clacking away, Ruhl gave a war-whoop and charged down the hill, blasting away enemies as he ran. The others weren't far behind him, but his head start got him to the enemy camp first, and it was Ruhl who raised his gun high and brought it sweeping down to kill the last enemy soldier. "Death to Hasar!" he shouted.

And then all the others charged together behind and into him, laughing and shooting into the air and raining curses down upon the Hasar-devils. In the midst of it all a clear voice intruded, carried on the light breeze: "Ru-u-uhl! Lunchtime!"

"Aw," Ruhl groaned reflexively. Raising his voice, he called, "Okay, Mom!"

"I'd better go, too," one of the others said.

"Yeah, me too," someone else seconded. "Can everybody come back after lunch?"

"I gotta go to the doctor's," the girl with the Flash-Back said disgustedly. "Maybe I'll get back early, though."

"Can I borrow your gun while you're there?" Ruhl asked eagerly, before anyone else could get the same idea.

"Well . . . okay." She handed it over. "But you be careful with it, or else."

"Ruhl!" the clear voice came again.

"Coming! See you guys later."

Clutching the Flash-Back rifle tightly, Ruhl trotted over the hill again, heading for home. He couldn't remember ever having such a fun summer vacation. There was an excitement in the air, both at home and in the village streets, with the news playing marching music and showing warjets and even spaceships flying by in formation. He just wished Lorikhan would hurry up and attack Hasar, so they could get back the Enhoav Basin that the Hasar-devils had stolen. *Then* he'd get to see some *really* neat stuff.

Grinning, he bounded up the steps of his house and barreled through the door. If he ate fast he could be back on the battlefield in half an hour.

Cyrilis's numbers gave the speed and direction the Drymnu had taken when it entered hyperspace, but of course there was no way to predict how far the alien ship would go before dropping back to normal space. Working on the assumption the alien would be more interested in the solar systems along or near its path than in the emptiness of interplanetary space, Pahli brought the *Susa* out of hyperspace at the first system along the projected path.

They were in luck. "Para-Cerenkov radiation, Commander," the scanner chief reported within minutes of their arrival. "Intensity indicates we're only an hour or two behind him."

Which was practically on top of him, considering it had been a ten-day trip. "Full-region scan," Pahli ordered. "I want that ship located as soon as possible."

"If it's still here," Cyrilis said.

It was. The search took three hours, but they finally found the alien's space-normal drive spectrum near a gas giant in the outer system. Five hours after that the *Susa* was in close-communication range.

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"Why have you followed me?" the Drymnu asked after Pahli had identified himself. "I wish no contact with you."

"Why not?" Pahli asked. "We have no hostile intentions toward you."

"That is a logical contradiction. You are a fragmented species—by definition you are hostile toward all other forms of life. You are a blight upon the universe, and unfit to commune with the other intelligences."

"So you consider us violent, do you?" Pahli asked interestedly, his eyes on one of his displays. "I take it you are more peaceful?"

"I am at peace with myself, and do not make war upon other species."

A light flashed on Pahli's display; the torpedo room was ready. "That's good, because it gives me hope that you can help solve our problem. Our world is currently threatened with war—"

"Then perhaps you will yet correct the error that has occurred," the Drymnu said. "Your self-extermination should have taken place long before you reached the stars. This conversation can serve no purpose. Do not attempt to follow me again."

"You will at least listen to my request." Pahli's tone made it clear it wasn't a question. "If you attempt to energize your drive we will destroy it. Our torpedoes are already locked on target."

There was a long silence, and when the Drymnu spoke again its flat voice was infused with bitterness. "As I said—a hostile and violent species."

"True. It's for this reason we need your help."

"I will die, and all the other segments of the Drymnu too, before I help you in your destructive path."

"That's not the sort of help I want." Pahli braced himself mentally and took the plunge. "I want you to help us become a hive mind like you yourself are."

Ahmar spun around, his face a mirror of surprise. Across the bridge Cyrilis's expression was similar, but shading rapidly toward alarm. Keeping an eye on his first officer, Pahli said, "Drymnu? Did you hear me?"

"Please repeat. I think I have made a translation error."

"No, you heard correctly," Pahli assured him. "I want you to help us find a way to become a single mind."

"Why?"

"As you said, we're a violent race. We've come close to destroying ourselves far too many times, and now we're on the brink again. Trying to resolve disputes with force never works. We need to learn cooperation and mutual understanding, and I think this may be the only way we'll ever do so."

"What makes you think I can help you reach this goal? Or would wish to?"

"You're clearly more advanced than we are in some ways; certainly you've had more experience with other races." Pahli shrugged. "And if you hate the idea so much of sharing the stars with a fragmented race you should be happy to help."

There was a long pause. "I must consider this," the Drymnu said at last.

"Fine, take your time. We'll be waiting for your answer."

He tapped the switch as Cyrilis left his station and floated over. "A word with you, Commander?" he asked, his

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stiff tone belying the politeness of his words.

Pahli looked up calmly. "Certainly."

Cyrilis's eyes flickered around the bridge, and when he spoke it was with lowered volume. "With all due respect, sir, what the hell are you trying to do?"

"Find a solution to war on Kohinoor. Anything wrong with that?"

"The idea, no. The method, yes." He ticked off points on his fingers. "First of all, you have no idea whether this—this hive mind thing is even possible for humans to achieve. Secondly, even if it is, what makes you think that an alien creature who's never even *seen* men before can come up with a way to do it? And thirdly, he's already said he'd like to see us all dead. What's to stop him from just seeding Kohinoor with some sort of plague once we bring him there?"

"The fact that he's never going to come anywhere near Kohinoor. There are one hundred eighty-six men and women aboard the *Susa*; we can supply whatever test subjects are needed. For the rest, I think it's a worthwhile gamble."

Cyrilis's eyes widened momentarily. "You're going to let him experiment on your own crew?"

"As you said earlier, it's our job to take risks. Your concerns are noted; you may return to your post."

For a second it looked like he would refuse. Then his cheek twitched, and he pushed off of Pahli's chair. His back was unnaturally stiff as he drifted back across the bridge.

There was a delicate cough at Pahli's side. "Commander . . . are you sure you know what you're doing?"

"You have objections, too, Ahmar?"

"Yes—the same ones Lieutenant Cyrilis has, as a matter of fact. Plus one more: some of his fears are going to make a lot of sense to the crew."

The unspoken implication hung heavy in the air. "Are you suggesting Cyrilis might lead a mutiny?" Pahli asked, dropping his voice to a bare whisper.

"I think his reaction would depend on whether he sees this as a threat to Hasar. Don't forget, sir, that *his* loyalties aren't to nebulous concepts like world peace, but strictly to his nation."

"True." Pahli thought for a moment. "All right, try it this way. If we succeed in uniting the *Susa*'s crew into a single mind, consider what kind of warship she'd become. Instant communication between spotters and gunners, wounded and medics, officers and crew—half of all ECM equipment is designed to disrupt either scanners or intraship communication, you know. The *Susa* would be unbeatable by anything even twice her size."

Slowly, Ahmar nodded. "Makes sense. Yes. Yes, I think that's the way to sell it."

"Okay. Get busy and come up with a list of advantages that'll satisfy even the diehards. I want the whole crew behind me by the time the Drymnu gives us his answer. And get someone busy figuring out what sort of safeguards we'll need on computer files, navigation equipment, and such to make sure the Drymnu doesn't get even a hint of Kohinoor's location."

Ahmar smiled wryly. "Good idea. The diehards will insist on that."

"Diehards be damned—*I* insist on it."

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Ahmar sobered. "Yes, sir." Turning back to his board, he got to work.

Twenty minutes later, the Drymnu agreed to the experiment.

"I'm sorry, Madame Jalal, but you understand we can't give out information on the activities of our ships," the young junior lieutenant said, his face as glacially impersonal as his words.

Out of the phone's vision range Narda made a fist of frustration. "I realize that, Lieutenant," she said in her calmest available voice. "But my husband's never been so overdue before and I'm beginning to get worried. Can you at least tell me whether or not you've been in contact with the *Susa* in the past two months?"

"I'm sorry, but all military communications of that sort are classified."

This was getting her nowhere. "I see. Thank you," she said, and broke the connection.

For a minute she just sat there as ghosts and unnamed fears swirled up around her. The "classified communications" fable didn't fool her for a minute—Command didn't know where the *Susa* was, either.

The world wavered as tears came to her eyes. If Pahli were lost, it would be her own fault. Those thoughts she'd had, and all those surreptitious glances at Mehlid the artist—she was being punished for them now.

Abruptly, she brought her fist down hard on the table. "Stop it!" she snapped aloud to herself, breaking the circle of fear and self-reproach. The universe didn't work that way, she knew—cause and effect were seldom so neatly tied together. The *Susa* was simply behind schedule; having mechanical trouble, perhaps. Pahli would come back home *soon, and when he did all her fears* would seem silly. In the meantime, she might as well put all this nervous energy to work. The house needed a thorough cleaning, for starters.

Still, as she worked, she took care not to look out any of the windows that faced Mehlid's house.

Pahli finished the latest report and turned off the reader. Rubbing his eyes tiredly, he asked, "How are they this morning?"

"Davaran's still fine, though not showing any measurable telepathic or empathic abilities," Ahmar told him. "Tavousi's still hemorrhaging, but he's stable and occasionally conscious."

"Still telepathic?"

"Yes. The drug's effect seems permanent."

Pahli grunted. "Then we're back to square one again: too little of the drug doesn't do anything, and too much starts the brain bleeding."

"Well . . . the Drymnu hasn't quite given up on this one yet. There's a modification he and the medics are working on—replacing a section of one of the amino chains with a different one, I think. If the Drymnu's right it'll give the drug an extra anti-hemorrhagic effect; I don't know how. It should be ready to try this afternoon."

"I don't know." Pahli traced the edge of the disk reader control panel with his finger. "Maybe we should just give up and go home. We've lost four men already, and all we've gotten in exchange is proof that the human brain has latent telepathic abilities. And we

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learned *that* in the first three weeks. The past three months have been a complete bust."

Amazingly, Ahmar chuckled. Frowning, Pahli looked up. "What's so funny?"

"You are, sir. You're starting to think in hive mind types of timeframes, as if we could already work at top efficiency. Four months and we've *only* proved man is telepathic?"

Pahli had to smile. "I see what you mean. I guess things went so fast right at the beginning that I lost perspective. All right, we'll take another shot with this drug. Let me know when there are any results."

The commander would later liken that day to the first punch-through in an enemy battle front, the stroke which enables unraveling maneuvers to be started in all directions. By mid-afternoon the modified drug had been synthesized and given to the first two volunteers; three hours later the dosage was doubled, and soon afterward tripled. The telepathic ability showed up in late evening, and by morning of the next day both test subjects could pick up surface thoughts at will from anyone on the *Susa*. Twenty-four hours later the telepathy was still present and none of the usual cerebral hemorrhaging had begun. The dosage was increased still further, and within another ten hours the drug had reached saturation level, at which point further injections were simply excreted. No physiological problems whatsoever could be detected . . . and the two subjects behaved increasingly like two parts of the same person. Four more volunteers were started on the treatment; then six, then ten. By the time Pahli felt ready to try the final test a foolproof delivery system had been developed. Foolproof but with a slightly delayed effect—it took sixteen hours for the rest of the *Susa*'s crew to begin to feel the incredible experience that was the fledgling hive mind. But it worked . . . it *worked!*

Thirty hours later the *Susa* was on its way home.

It was a novel and curious experience to view the blue-and-white globe of Kohinoor simultaneously from every viewscreen and scanner on the ship. *Home,* Pahli thought, and through his mind flashed images from one-hundred-plus home towns and cities that the word evoked—a kaleidoscope of faces and sounds from the *Susa*-mind's collective past. A ripple of mild nervousness accompanied it, a last vestige of the emotional shock everyone had felt to one degree or another back at the beginning as all their dark thoughts and secret dislikes suddenly became public knowledge. It had been a sobering and painful experience, and it had taken several hours for the new strains to be worked out. But they'd managed it, and had adapted to their new relationship with a strength of will that had surprised all of them. Without a doubt, Pahli thought, he had the best crew in the universe . . . and a whisper of pleasure echoed through the ship at the compliment.

The feeling faded into a kind of comfortable background as the mind turned its attention to more immediate matters. In their tubes, ready to fire, were a score of modified seeker torpedoes, their warheads replaced with flasks of the bacteria the Drymnu had developed to deliver the "brotherhood drug." Once

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inhaled, the bacteria would travel through the bloodstream until it reached the brain, where the high concentration of certain hormones would release the drug from its hiding place just under the cell wall.

I sense the people of Kohinoor, part of the mind—one of the first who had used the drug, in fact—reported, and an instant later the sensation flowed from him to the rest of them. Pahli nodded in satisfaction. That had been the only part of the plan they'd been unsure of: whether or not the drug would make the telepathic melding strong enough to stretch between countries. But if they could detect the planet's untreated minds from space then there would be no problem. The new hive mind would encompass all of Kohinoor.

It also implies the power grows stronger with time, Cyrilis pointed out. Pahli saw the first officer's logic instantly—if he hadn't, of course, he would have caught on almost as fast through someone else—and for a moment he wondered if that was cause for worry. *No, it'll merely draw us all closer,* someone said, his thought accompanied by general agreement from the others. Pahli relaxed. They were right, of course. One of the *Susa*-mind's first major conflicts had been between those who wanted to keep the advantages of the hive mind for the Hasar Nation and those who wanted all Kohinoor to join in, and it had been only as the interaction deepened that the issue had been resolved. Even the most militant among them, it was discovered, saw strength of arms as a means to insuring peace—and once that common goal was established consensus in the method followed quickly. Only by extending the hive mind to all nations would there be a lasting solution to war. And the stronger the telepathic ties between people, the better the mind would function.

Through a scannerman's eyes Pahli saw the indication that a laser beam was focusing on the *Susa*'s hull; through the signal officer's ears he heard the words riding that beam: "Hasar Military Command to the *Susa*; come in, please."

Open the circuit, Pahli commanded, clearing his throat. "This is the *Susa*," he said, startled a bit by the sound of his own voice—a sound he hadn't heard for over a month. "Commander Jalal here."

A new voice came on, and as the laser steadied on its target a picture swam into view as well. "Commander, this is General Amindari. Are you all right up there?"

We're in position now, the *Susa*-mind reported.

Fire the first five missiles. "Perfectly, sir. I'm sorry we're so late, but we had some equipment malfunctions on our way back. Nothing serious, but time-consuming."

"All right, we'll wait until you're down to debrief you—what?" The general disappeared off camera for a moment, and when he returned he was frowning. "*Susa,* scanners indicate you're firing seeker torpedoes over Hasar territory. What's going on?"

Pahli had thought about this moment for days and had all the proper expressions and words ready. "What?" He pretended to study his telltales in consternation. "Damn! Part of the malfunction—I thought we had it fixed.

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Gunner control!—lock onto torpedoes and destroy.'' *Wait a few seconds first, to give them more distance.*

Of course. Already locked on.

''Do you need assistance?'' Amindari asked. ''Our ground-based lasers are ready and tracking.''

''Unnecessary, sir.'' *Fire.* ''I'm sure we can—ah, there we go. Got them all, sir.'' All of them properly shattered by the *Susa*'s lasers, releasing the bacteria to drift down onto the people of Hasar.

''*Susa*, your braking orbit is projected to take you very near to Lorikhan territory,'' the general said. He sounded a little worried. ''If you're having trouble with your tubes maybe you'd better hold in space until we can get a tender alongside to off-load your torpedoes.''

''Negative, Command; we're all right,'' Pahli said. This whole subterfuge was a little silly, but releasing missiles near Lorikhan air space was bound to make the defense people there nervous, and it might help if their spy equipment had seen the same thing happen over Hasar first. They would certainly send scoop drones to test for the presence of dangerous microorganisms, but the bacterium the Drymnu had used was only a slight variation of a harmless strain already on Kohinoor. By the time anyone found out differently, it would be too late.

A hundred kilometers past its closest approach to Lorikhan, the *Susa* fired and then destroyed six more of its missiles; the remaining nine were exploded in wind patterns that would take their contents over Missai, Baijan, the Enhoav Basin, the Urm District, and the tiny republics of the Ihrahil Mountains.

It's done, the *Susa*-mind said. *Let's go home.*

As it had on the *Susa*, the drug's effect appeared only slowly; the ship had landed and its crew—still in contact with each other—were undergoing debriefing and medical checks before the first wisps of contact began to be felt by the people of Kohinoor. At first it was thought to be individual hallucinations; then mass hallucinations; and then a new type of enemy attack. The Last War could have started right then, with launchings of doomsday missiles that would have ended war on Kohinoor in their own ghastly way. But the missiles remained in their silos, satellites, and submarines, for the simple reason that by the time the brotherhood drug was perceived to be an attack the generals were not the only ones with their fingers on the buttons. The people near the various command centers, fearful though they might be, did not want to fight back that way.

So the bacteria multiplied and the telepathic unity grew, uniting families and cities as the physical boundaries of mountains, rivers, and borders ceased to exist. Like a tapestry woven in fast motion the web of awareness and communication spread. The handful of spaceships still in orbit were ordered down to join in the change, before their unaffected crews could misinterpret what was happening and use their weapons rashly.

Within hours the *Susa*-mind's mission was accomplished. War on Kohinoor was forever ended.

It came to Shapur Nain as a curious feeling of lightness and almost-forgot-

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ten youth, and he nearly lost his balance as the word *senility* flashed through his mind. A few dozen meters to his right a group of children had been playing steal-ball, but even as he turned to face them the game ground to a halt, the players looking at each other with wide eyes. One of them glanced at Shapur, and he caught an incredibly sharp sense of wonder and fear. He thought to tell the boy it was all right, but before he even opened his mouth he felt a ripple of reassurance from the group. His own surprise and confusion at this premature result somehow struck them as funny, and as their laughter echoed through his mind he felt their fear evaporate completely. Recovering from his surprise, Shapur joined in the hilarity. *Anything one can laugh at can't be all evil,* he thought, and the children accepted the nugget of wisdom readily and without question. It had been a long time since anyone had listened to anything Shapur had to say, and it felt good.

New tendrils of awareness were beginning to creep into his mind, both from the buildings surrounding the park and the cars on the streets bordering it. He could hear the screech of brakes as startled drivers slammed to a halt, snarling traffic and adding to the confusion and growing panic. Instinctively, Shapur threw himself against the fear, even as he'd done with the children. *Don't panic! It's all right, we'll be all right. Together we can handle whatever is happening. Fear and panic will gain you nothing.* The children joined with him, adding their strength to his assault. The wave of fear poised for a moment against their island of reason . . . and then, slowly, the wave's strength began to decay. True, there was nothing like tranquility or joy yet in the growing web, but the cautious wait-and-see attitude that was rapidly smothering the panic was a big improvement.

So engrossed had Shapur become in the happenings around him that someone else first noticed that his left leg was hurting. Getting a new grip on his cane, the old man began to move again toward the bench he'd originally been aiming for. He sensed and then saw two of the children detach themselves from their group and move alongside him. With their added support he reached the bench in—for him—record time. He thanked them mentally as he sat down, and was pleased to find that happy smiles had their mental equivalent. The two ran back to their friends, and after a brief mental conference got back to their game. Though the rules were clearly different now.

Resting back against his bench, with one part of his mind enjoying the children's game, Shapur reached out to the growing consciousness around him. Whatever was happening, he knew he'd want to stay alert and be an active part of it.

It was nighttime in eastern Lorikhan, and Ruhl Tras was fast asleep when it happened there. For him it began as a dream which, though strange, was not as nightmarish as some he'd had. Once, in the middle of the night, he woke up with his heart pounding and the taste of fear in his mouth, and he almost cried out. But, somehow, he could feel that his parents were with him, and with that strange but warm presence to calm him

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he rolled over and went contentedly back to sleep.

By morning he had grown reasonably accustomed to the whole thing. What all the panic was about he couldn't really understand.

Narda Jalal thought she was going insane.

"Oh, no," she gasped, clutching her head with both hands as the whispers of—what?—grew stronger. "No! I can't—I mustn't!" She began to talk to herself, louder and louder, trying to drown out the voices invading her head. But it was no use. Louder and clearer they became, voices of fear and confusion that mirrored her own feelings. "Pahli!" she gasped in hopeless anguish. But he was lost somewhere in deep space. . . .

Narda? Narda, can you hear me? Relax, darling, it's all right.

Pahli? No, that was impossible. A cruel trick of her dementia—

No, it's not, the voice in her head assured her. *It really* is *happening. We're making Kohinoor over, making it so there will never again be war on our world.*

For a moment she forgot the other voices. *How can that be possible?*

You're feeling it already. All our people are being melded into a single vast consciousness that'll span the planet. Never mind how *for the moment—you'll learn soon enough. I'll be home soon, but until then we can talk telepathically as much as you like.*

The voices—minds—around her had listened to the entire exchange, Narda realized, and it seemed to have relieved some of their own fears. That it *was* a true conversation and not something self-generated she no longer doubted, somehow. *All right. But please hurry. I don't like being away from you.*

His chuckle echoed through her mind. *We'll never be apart again, darling. I promise.*

They talked only sporadically after that. Narda had always preferred face-to-face communication over the long-distance variety, and she still couldn't see this telepathy as anything more than an elaborate wireless phone network. Still, now that she could watch what was happening without fear for her sanity, she began to get a glimmer of what Pahli had been talking about. Already she could see that this wasn't going to be just a new sort of town meeting. The more distant thoughts came, like Pahli's, as a normal spoken conversation would, but she could feel a deeper melding taking place with those people nearby. As if she could see through their eyes or feel what they were feeling—

She jerked, physically, as if she'd grabbed a live wire. For a second she'd touched Mehlid—had seen his current painting, his palette and brushes—had been as close to him as she ever was with her husband. And had enjoyed it. . . .

Had anyone noticed? She hoped not, but knew down deep that even if she'd escaped this time it was only a temporary reprieve. All the contacts were growing stronger, and soon she wouldn't be able to avoid Mehlid's mind no matter how she tried. And then he'd learn about her silly thoughts, as would all the neighbors . . . and Pahli.

Oh, Pahli, she groaned, already feeling the shame that would come.

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Narda? Hang on, I'm on my way home now. I'll be there soon.

She'd forgotten how near he was. *Please hurry*. Perhaps having him near would distract her from— Gritting her teeth, she forced herself to think of other things.

He was there within fifteen minutes, and for the last hundred meters she was able to follow his progress through his own eyes and mind. She was standing in the doorway as he brought his car to a halt and bounded up the steps, smiling all over. *Narda!* his thought came, wrapping itself around her like some exotic fur.

And then she was in his arms, clinging tightly to him. His mental presense, incredibly strong at this range, was almost frightening in its intensity. It was as if her six years as his wife had only let her scratch the surface of who he really was. Suddenly she could see that he was far more complex a person than she'd ever realized. It was exhilarating, but she knew they'd need a lot of quiet time together to adapt to this newly deepened relationship.

Pahli, however, had been in space for a long time, and he had other things on his mind. Under his caresses, both physical and mental, she felt herself responding with unexpected passion as his impatient desire both fed and drew from hers. Together they moved toward the bedroom, undressing each other as they went. At the side of the bed he lifted her tenderly and laid her on the softly swaying mattress. Sitting down on the edge, he reached out—

And in the space of a single heartbeat her passion turned to ice as a horrifying truth stabbed like lightning through her mind.

Even in the old days Pahli wouldn't have missed the abrupt change, and he certainly didn't now. *Darling, what's wrong?*

She could hardly even bring herself to form the thought. *There are . . . people watching. They're* watching *us!*

He frowned at her, confusion uppermost in his mind. *But . . . they're not really watching. They don't especially care what we're doing. We ran into this a little on the* Susa, *but once the initial shock wears off you won't even notice the rest of the mind. Trust me.*

She couldn't. She'd always been too private a person to change so quickly into . . . into an exhibitionist. And among those who'd be watching—

It's not like that, Pahli protested. Abruptly, the texture of his thoughts shifted. *What's this about Mehlid?*

Nothing! she thought, too quickly. Even to herself it rang false.

His face hardened, and she felt his mind probing hers, searching—she knew—for evidence of infidelity. She endured the inquisition without protest, her thoughts dark with shame . . . and this, too, was being watched.

It seemed like a long time before he pulled back. *I'm sorry,* his thought came, and she sensed his own shame at his suspicions. *I'm sorry. I shouldn't have done that.*

It's all right. She tried to really mean it, but knew she didn't fool him. Steeling herself, she asked, *Do you want to continue?*

I guess not, he answered, and she realized his lust had drained away in the

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past few minutes. For a moment he sat on the edge of the bed and looked at her, and she felt his love and concern. Standing up, he found his pants and began to get into them. *It'll be okay,* he assured her as he dressed. *It'll take a while to get used to this, but it'll be better for all of us—you'll see.*

I hope so, she answered, reaching for her own clothes.

But the other minds were still there. Watching.

There was much to be done.

What shall we do with all these weapons?

Destroy them, of course. Electrical components and motors can be reclaimed; the other metal parts can be melted down and reformed.

Melting is costly, but we have an experimental process that uses a series of electrocatalyst reactions to separate out the different metals of an alloy. The system's not yet ready for general use, but we think it shows promise.

The Kohinoor-mind took a moment to give directions. The process *had* been a Lorikhan military secret, but now all interested scientists and technicians would be traveling there to help develop it for practical use. Already similar joint efforts were under way to improve crop yields in Baijan, public health in the Urm District, and housing in slums all over the planet.

And what of the doomsday missiles? Should we keep such weapons as safeguards against invasion from outside our system?

Unnecessary, the elements which had once been the *Susa*-mind argued. *Only other hive minds travel the stars, and they're uniformly peaceful.*

So says the Drymnu, was one skeptical reply. *And even if true, at least one fragmented race travels space as well.*

Yes, the mind agreed. *We must decide how we can bring our brother humans to share out unity. Until then—*

The debate was long, but the issue was eventually resolved. The doomsday missiles were removed from the planet and placed for safekeeping at Kohinoor's trailing Lagrange point. There were no hard feelings about the decision, but the very fact that debate was needed showed that the Kohinoor-mind was not yet functioning as capably as the Drymnu had. *But our hive mind is still young,* Pahli and some of the others pointed out. *We must give ourselves time to adjust.*

On this too the mind agreed. But an underlying strain remained, a tension that the elimination of war had not relieved. *A more equitable sharing of resources is necessary,* part of the mind said, and steps were taken to correct the disparity. *Will the powerful still deny justice to the weak?* another part asked. But the telepathic contacts were becoming ever deeper with time, and it was clear that soon the "powerful" and the "weak" would effectively merge. At that point justice and self-interest became identical motivations. The weak saw, and were satisfied.

But the tension remained.

Give it time, was the only answer the mind could offer. *Give it time.*

As had been anticipated, the telepathic contact between people grew stronger as the weeks went by. But far

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from relieving the tension, it seemed to make it worse. . . .

Ruhl Tras trudged outside to the empty field near his home, fingering his ball restlessly. It was almost the only toy he could play with these days that didn't bring a flood of disapproval from one part of the Kohinoor-mind or another. Some of his playthings were too dangerous, to someone's way of thinking; others were considered a bad influence—especially his guns—and others were simply deemed "childish," with an accompanying sense of guilt he couldn't understand. His parents had tried to help him, pointing out again and again to both him and the mind that he *was* a child and should be allowed to enjoy that part of his life without interference. But it was hard to ignore the constant presence and instruction of so many adults, especially when he'd always been taught to respect his elders. Some of them, to be fair, were now bending almost backwards in trying not to influence him . . . but for the closer ones that was an impossible task. And even worse, his parents' own resolve was beginning to give way under the conflicting views on child rearing that continually buffeted them. Ruhl had always thought his parents were doing a good job of raising him, and their growing uncertainties about that made him very uneasy. Many of his friends, especially those whose parents had been pretty unsure of themselves to begin with, were a lot worse off than he was. Their fears and growing mental chaos were a permanent spot of pain in his mind.

Pain. That, probably, was the thing he feared most about what had happened. Pain was no longer limited to something in your body that hurt, and that rubbing or spraying with salve would end. Now, he could feel—had no choice but feel—every pain in his whole village. Some of it could be blocked, and some of it could be drained off—somehow—by the people around him. But some of it always got through, always lasted until the person who was actually hurt got treated. Pain could come from farther away, too, carried like a ripple in a pond by intermediate minds, but that kind could be blocked more easily.

Even as he thought about it a sharp twinge shot through his leg. Automatically, he blocked it out. He'd felt this one before—an old man in Missai Gem with a hurt leg. Shuddering, he remembered the first time the pain had come to him. It had been accompanied by a horrible vision of a damaged warjet sweeping in to the pitted deck of a carrier, where the impact shattered its hydrogen tanks and turned it into a hailstorm of shrapnel and a terrible fireball—

Ruhl slapped the side of his head to clear it, even as he felt the pain of that memory spread out among the people around him. For now he could still do that, could drive such thoughts and feelings away with simple tricks of distraction. But what would happen, he wondered bleakly, when the region around him grew to include the old man and his memories? And it would . . . he knew it would.

It wasn't something he could afford to think about.

He'd reached the field now, and for a moment looked around him, wishing

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for the days when he and his friends had played here together. But wishing for the past was childish . . . or so someone had told him. Hesitantly, half-expecting to incur disapproval, he began to play with his ball.

Shapur Nain leaned against the wall of his apartment as the pain quickly subsided and was replaced by the lightheadedness of the capsule he'd taken. He hated drugs—hated them with a passion—and left to himself he would rather have gritted his teeth and waited out the discomfort. But such decisions could no longer be made with only his own preferences in mind. The hive mind was broadening, and pain had become a problem for the community as a whole. Shapur had lived with intermittent pain for many years now, and he knew there were limits to how much the human psyche could take. Whatever the cost to himself, it was his duty not to add more pain than necessary to the people of Missai Gem.

The first wave of dizziness passed, but for a moment he remained against the wall, staring at his last thought. *The people of Missai Gem.* Once, he would have referred to them as his countrymen or his neighbors; in the first days of the Kohinoor-mind he would have called them friends or comrades. *The people of Missai Gem.* The expression damned with nonexistent praise. What had changed?

The answer came instantly, as if it had been waiting to ambush him. *You're the one that's changed. You've become hypercritical of everyone around you.*

Not true, he shot back, but even as he said it he knew they were right. He'd always had a touch of the judgmental in him—in the Missai Air Defenses he'd made a fair number of enemies that way. His usual solution in the past had been to simply avoid people whose quirks and shortcomings irritated him. But now—

Now he could see deeply into the minds and souls of literally millions of people. And there was no avoiding any of them.

You conveniently forget your own faults, of course, don't you? You've raised more hell than a lot of those you criticize. You're no better than anyone else on Kohinoor. Maybe worse —hypocrites are usually worse.

Clenching his jaw, Shapur pushed off from the wall and made his stiff way to a chair by the window. To hell with all of it—the hive mind and everything else. He couldn't change the way he was made, and he was too old to try.

From the window he could look out on the park. Drenched with sunlight, its full contingent of rusinh and treemice milling about in uncaring ignorance of mankind's new condition, the square of greenery looked even more inviting than usual. But Shapur wouldn't be going there today, as he hadn't gone yesterday or the day before. Nowhere on Kohinoor could he have solitude any more, but at least within his own four walls he could have the illusion of privacy.

Illusion! The thought was scornful, and only part of the contempt came from outside him. *And you look down on the rest of us!*

Shapur ignored the slur. Propping his cane by the window, he placed his vial of pain pills on the sill within easy reach and settled back to survive another day.

Pahli woke with a start, heart racing,

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and for a long moment he lay staring into the darkness in groggy confusion as the thoughts from a million other minds complicated his effort to remember where he was. Then the figure beside him moaned and stirred restlessly, and things came back into focus. He was home with his wife . . . and it was she who was having the nightmare that had awakened him.

Rubbing his temples tiredly, he gazed at Narda, his mood a mixture of irritation and concern. He'd tried to be patient with her, recognizing that she needed time to adjust to the Kohinoor-mind. But it had been six months now, and in many ways she was no better off than she'd been at the beginning. Her fear of the voyeuristic potential of the hive mind remained especially strong; she showered and dressed alone these days, her eyes either closed or rigidly fixed on something harmless. And their sex life—

Pahli's irritation shaded into anger. They'd made love exactly twice since his return, and both times she'd been so tense it had been a waste of effort for both of them. For a short time desperation had goaded him into considering an affair, but the misery that had caused Narda had made him drop the idea completely. It was no comfort that the problem was becoming chronic all over the planet, as only those with a touch of the exhibitionist seemed still able to perform. Those who deliberately watched did so enviously.

Narda's dream was becoming darker, and Pahli realized his irritation with her was influencing it. With an effort he fought the mood, feeling her nightmare's texture change as he did so. They were trapped in a no-win situation, he thought dully: he couldn't conceal his dissatisfaction even long enough to encourage her efforts; and she, in response, had effectively given up in despair.

Turning over on his side, Pahli closed his eyes. He was tired, but sleep was going to be hard to recapture now that he was awake. Around him the Kohinoor-mind swirled its kaleidoscope of thoughts, almost as many now as in the middle of the day. The ever-growing number of minds impinging on each person had driven many to search for a semblance of privacy in the traditional hours of sleep. The first few to take up nocturnal habits had indeed found relative quiet; now, with a third or more people doing it, the advantages had become illusory. Like standing up at the stadium, in the days when there were such things as games.

A myriad of thoughts echoed through his mind, giving him the feeling of living in a crowded auditorium with perfect acoustics. He wasn't the type that needed even moderate amounts of privacy—he could never have survived conditions on the *Susa* if he had—but lately he had felt strangely oppressed by the gaze of this eye that never blinked. Had he changed so much in the past months? Or—

Or was he absorbing the characters of those around him, losing himself to the greatest leveling force humanity had ever known?

Were all men finally to be made truly equal?

The thought jolted him like nothing else ever had. Somehow, he'd never considered all the hive mind's impli-

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cations on such an intensely personal level before. *I've been blinding myself,* the thought came. Was that his own opinion, or the Kohinoor-mind's?

Does it matter any more?

Something inside him snapped. *Get out of my mind!* he roared, shocking even himself with the virulence of his sudden hatred. The hive mind recoiled, but it didn't—it couldn't—do as he demanded. And as it settled back around him he saw his anger sweep outward like a tsunami, adding its contribution to the growing blackness. How long, he wondered, before the darkness overwhelmed them all?

Give it time, came the mocking, hopeless reply.

And finally it was finished. The hive mind encompassed all of Kohinoor, linking each mind directly with all the others.

Shapur Nain locked his apartment door behind him—an unnecessary precaution, since the Kohinoor-mind already knew full well what he planned. It could have stopped him long before now if it had cared to. But after the first few it had given up the use of physical force and now limited itself to a—to him—pathetic effort at moral persuasion.

We still need you, Pahli Jalal said; but the appeal lacked conviction. Shapur knew that the former commander of the *Susa* felt each of these deaths strongly—more so, perhaps, than the average person—but even he had bowed to the inevitable. And Shapur's motives, unlike those of the others, were not purely selfish. To him, if to no one else, it was an important distinction.

Please don't do this just because of me, Ruhl Tras pleaded as Shapur drew the vial of pain pills from his pocket. Of all of them, the young boy felt the only genuine concern, and for a moment Shapur savored the feeling, as he had once enjoyed the beauty of flowers in the park. *I must,* he told Ruhl gently. *I don't know why my wartime memories strike you with such strong horror; but they do, and there's no other way I can stop that from continuing. Please don't feel guilty—this will be better for both of us.*

The boy sobbed once, and Shapur felt the mind reaching out with what little comfort it could still muster. Taking the cap off the vial, he swallowed the contents quickly. A few minutes would be all it would take. A bottle of his favorite whiskey—a close friend these last few weeks—awaited him by his window seat. Sitting down, he uncorked it and took a last, long drink. Then, setting it down carefully—*mustn't spill on the rug*—he sat back and gazed out at the park. Quietly, gently, he drifted off to sleep. . . .

Pahli sighed as the distinctively acrid tang of another death flowed like factory waste into the hive mind. Shapur was not the first suicide Kohinoor had experienced, but somehow his death was the final straw, as if with the old man had died Pahli's last desperate hope for Kohinoor's future. *It's over,* he admitted to himself, knowing as he did so that it was something the hive mind itself had already accepted. *As surely as if we'd fought the Last War, I've destroyed our world.*

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The blame must be shared, Ahmar and Cyrilis said together. *All of us aboard the* Susa *made the same assumption, that the hive mind on Kohinoor would exactly mirror our own experience. You had no way of knowing what a million-fold increase in the size of the mind would do—or of knowing how people who had never lived in the confines of a starship would react.* The words did not console Pahli; consolation no longer existed on Kohinoor.

Laying blame is a useless exercise. We've attempted to remake Man in our own way, and have paid the price for our arrogance. I wish we'd never met the Drymnu, or that the Susa *had been lost forever in deep space. Death is now the only escape for any of us from this poison-filled prison we've built.*

Perhaps not, the mind suddenly said. *Perhaps there is one other way.*

Within seconds the idea had been fully considered, its scientific, technical, and logistic ramifications examined in detail. It was desperate and probably a hopeless waste of effort . . . but only probably. For a world without any hope at all, the odds were good enough.

So for the first—and last—time the Kohinoor-mind began to work at its full capacity, throwing the combined power of two hundred million people into this final project. The results were staggering—a true echo, Pahli thought wistfully, of the efficiency and cooperation he'd once hoped to give his world. For such power to be used to complete the mind's own destruction was just one last irony.

They began to build starships. Hundreds a week at first, but within six months over a hundred thousand a day. Small and cramped, they were little more than shuttles with sleeper and recycling facilities, Burke stardrives, and planet-scanning equipment. But they would fly . . . and they would carry just one person each.

It took over two years to build ships enough for everyone, and the project left Kohinoor gutted of metals and other materials. In a way, it was fortunate that many of the weaker people were unable to stand the long wait and chose instead the easier escape. For them, of course, no starships were needed. . . .

For Pahli, it ended as it had begun, in the eternal darkness of space. Through his tiny viewport he watched as Kohinoor fell behind his ship. He was one of the last to leave—his sense of honor had demanded that—and within a day or two Kohinoor would be deserted.

Pahli, can you still hear me? the last remnant of the hive mind touched his. He didn't answer, but it knew he heard. *We don't blame you for what happened, Pahli. Please don't blame yourself.*

How can I not? I failed my world, and good motives are no excuse for the destruction I brought upon us. I've already accepted your forgiveness; allow me the privilege of withholding my own.

The mind seemed to sigh. *Very well, if that's truly your wish. But note that your self-imposed martyrdom is not without its irony. Indeed, you did* not *fail at the task you set for yourself.*

The contact was fading, and Pahli had to ask the question twice before it got through. *What do you mean?*

Through the growing silence he heard the faint answer: *You found a final solution to war.*

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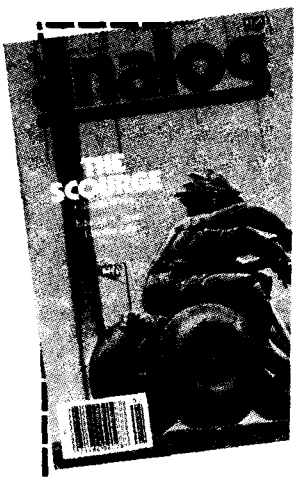
The contact broke, and for the first time in three years Pahli was truly alone. Taking a deep, clean breath, he shifted his gaze from Kohinoor's disk and scanned the rest of the sky. A hundred or more ships were still visible, their drives showing like tiny blue stars. Their passengers, too, were alone now as they prepared for the long voyage ahead. Perhaps—perhaps—a few years of solitude would break the hive mind forever, and bits of this mass exodus would someday be able to come together again safely. But Pahli doubted that would ever happen. Individual survival was all that was left to them now; on new worlds if they were lucky, aboard their cramped ships if they were not. Their cramped, one-man ships . . . and Pahli forced a bitter smile. Yes, the mind had been right; he *had* found a final solution.

It takes at least two people to have a war.

Behind him the sleeper tank chimed its readiness. With one last look at Kohinoor, Pahli went to strap in. He'd be entering hyperspace soon. ■



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Jay Kay Klein's biolog

If Dr. Robert L. Forward is to be likened to any earlier science-fiction writer, that predecessor would be Hal Clement. Like Hal, Robert glories in devising improbable worlds that might just be possible since their parameters are rooted in what we currently believe are the fundamental facts of nature. *Dragon's Egg*, a first novel published in 1980 by Del Rey Books, is about sentient creatures living on the surface of a neutron star and, reminiscent of Clement's *Mission of Gravity*, centers about communicating with Earthmen. Readers of this magazine first learned about the world of Mesklin, scene of *Mission of Gravity*, in the April 1953 issue. In the April 1980 issue, they first met Dragon's Egg. This world was so grounded in advanced physics that editor Dr. Stanley Schmidt listed the fictional account under "science fact."

Robert is a senior scientist in the Exploratory Studies Department of the Hughes Research Laboratories in Malibu, California. His specialty is coming up with far-out ideas that can be realized using present-day, available technology, including gravity sensors, laser propulsion, and electronic cooling. So recent is this technology and so fast its development, that the completed hardware for his first project (done some fifteen years ago as a graduate student) now rests in the Smithsonian That was the first gravity antenna for detecting gravitational waves from black holes and neutron stars. At Hughes he bettered this with the first laser gravity antenna and the rotating gravitational mass sensor.

Robert started writing science fiction to raise funds as a graduate student, publishing first in 1962 in a now-defunct magazine under the name of George Peterson Field. He was raised in New York State, received a B.S. and Ph.D. in physics from the University of Maryland, and an M.S. from UCLA. A visit to his laboratory by Jerry Pournelle and Larry Niven reawakened his interest in writing seven years ago, and now this is the only activity that he finds fascinating enough to pursue as an avocation beyond his scientific work. It should be mentioned that his son, Robert D. Forward, also writes.

Following the Pournelle-Niven visit, Robert wrote his first piece for *Analog*, "Far Out Physics," appearing in August 1975. His speculative articles have since appeared in nearly all the science-oriented magazines. These accompany some 40 scientific papers and 13 patents on the subjects of gravitation, spaceflight, and low-noise electronics. Somehow, he has also found time to present more than 100 lectures on gravitation, astronomy, and interstellar flight. ■

Dr. Robert L. Forward

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The Alternate View

GET THE WRONG PEOPLE OFF THE JOB

G. Harry Stine

"With regard to big space projects, there are three things to do: (1) get the money, (2) get the right people on the job, and (3) get the wrong people off the job."—Count Guido von Pirquet.

The United States faces a major problem with its educational system, especially in science and technology. For more than a decade, it's been operating with a philosophy that's false-to-fact. As a result, some professional people are undertaking tasks outside their field of expertise and competence. And they're blundering.

The philosophy that's causing the trouble results from the inability of people to distinguish between science and technology. Science is an organized body of knowledge; it has nothing whatsoever to do with accomplishing any task. Technology is a body of knowledge, some of which isn't backed by scientific explanation, which allows people to convert natural energy into social institutions.

Scientists may investigate and measure the basic nature of metals, but it's the engineers who build bridges out of metal, and some of that process isn't thoroughly studied or completely understood by scientists.

The fortuitous success of the U.S. Army Engineers' Manhattan District in 1942-1945 which produced the atomic bomb also put scientists on the top of the heap for the first time in history; they began to tell engineers what to do. Engineers then did it, but the scientists received the credit (rightly or wrongly). It became so thoroughly entrenched in the American way of thinking that TV news reporters still blather about the space scientists at Cape Canaveral working to get the space shuttle launched on schedule.

The heart of the science/technology problem lies in the modern college of engineering. Now it's turning out *two* kinds of engineers, but only one sort gets the honor of being called "engineers." The modern engineering curriculum is very much like the physics curriculum I went through more than 25 years ago. Modern "engineers" are highly educated in scientific theory, mathematics, and the sort of thing that physics majors used to study. In the meantime, what would have been the engineering curriculum at my time has been shifted to a new undergraduate major called "engineering technology" which is the old hands-on engine school stuff where you got your hands dirty in the lab four afternoons a week.

A lot of scientists are therefore trying to act like engineers and making damned

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fools of themselves in the process. Even some modern "engineers" who are really scientists by any other measure are making incredibly stupid statements, authoring some comical technical reports, and designing hotels that fall on guests and bridges that collapse while older bridges alongside continue to mock the floods.

The most recent insanity in this regard comes from an organization known as NRC. I'm told the initials stand for "National Research Council." From reading their most recent report opposing the development of Solar Power Satellite systems, I believed that NRC was the "National Registry of the Chickenhearted."

My first question was, "Why's the NRC studying the SPS?" The SPS is *not* a research program. The SPS is *not* a space science program. The SPS doesn't have one damned thing to do with scientific research and development.

When we do it, the SPS will be the biggest single *engineering* program of this century. I don't know who was on that NRC committee, but I'm willing to bet it didn't have a single member who'd worked on any of the big power projects—Grand Coulee, Glen Canyon, Four Corners, Zuni, and a long list of others.

When Peter Vajk, Gerry Driggers, myself, and others talked to managers and engineers of *utility companies* about the SPS concept almost 4 years ago, one utility company planner told us, "Stop treating the SPS like a space program and start treating it like a power project. Look, we don't sell electricity to the consumer by showing them technical reports and pictures of smokestacks, generators, hydroelectric dams, and power lines. We show them the benefits. Sell SPS on the basis of the generation and distribution of lots and lots of clean, cheap electrical power. *Don't make a big thing of the fact that the electricity's coming from space! That's incidental!*"

The utility company planner should have been consulted by the NRC for another reason, however. The planner knows we're going to have to come up with *billions* and *billions* (sorry about that!) of dollars of capital investment over the next 50 years to keep up with the growth of electrical usage.

The NRC report was concerned about the "difficulties" and the "enormous costs" of putting an SPS system on-line. They estimated a total cost of $3 trillion over the next 50 years. "The size and complexity of an SPS would strain U.S. abilities to finance and manage such an enterprise and, indeed, the *governmental machinery for making the decisions necessary to initiate and sustain it.*" (My italics.)

Don't they know that the U.S. government cannot possibly initiate and sustain the level of activity necessary to do the job? The federal government isn't structured for such a task any more than NASA has the proper organization to become StarTrak, the government's space transportation system operator. And why does the NRC tacitly assume the government's going to do it? Are they also forecasting nationalization of the utility industry, continued nationalization-in-fact of space activities, and failure on the part of private enterprise? Or is it just because the NRC is on the

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government teat in the first place?

And doesn't the NRC realize that (a) the cost of a coal-fired, gas-fired, or nuclear power plant on Earth is $2000 per kilowatt/installed, (b) the cost of an SPS is now estimated at *less than* $2000 per kilowatt/installed, and (c) the utility industry in the United States must build *more than* $3 trillion worth of new electrical capacity in the next 50 years *no matter where or how it's built?*

Question: Since we're going to have to spend $3 trillion on new electrical generating capacity in the next 50 years, why not build it in space to use a renewable energy source and, included in the $2000 per kilowatt/installed basic cost, buy something that will also pay for a real space transportation system, use of extraterrestrial materials, and space industrialization?

Since the NRC is now making evaluation studies of engineering programs, perhaps they should tackle some of the problems that are a consequence of *not* building an SPS system: (a) How do we rebuild every railroad right-of-way in America in order to haul the coal required to generate the additional electrical capacity we'll need over the next 50 years, and (b) What do we do with the tons and tons of goo and sludge that has to be removed from the stack emissions of those coal-fired power plants, stuff that's carcinogenic, toxic, and, unlike radioactive wastes whose activity decays over time, remains that way *forever?* And how do we replace the valuable chemical feedstocks that went up the stack as combustion products and can never be recycled?

Scientists are *not* engineers and they *should not* and *must not* make technical decisions that engineers are trained to make.

Back in the "early days" at White Sands, when a rocket called "Viking" was being flown about once every 6 months (if luck and the budget permitted) for carrying scientific measuring equipment to the astounding altitude of 100 miles or, if everything worked as it once did, to 156 miles altitude, the project scientists were theoretically in charge of things. But it fell to engineers and technicians with dirt under their fingernails to make that Viking rocket work in spite of Murphy's Laws. Sometimes the scientists would fuss with their equipment endlessly. Sometimes, they'd also fuss with the Viking rocket—tweak and fiddle, calibrate and recalibrate, fuss and bother. Try to get another quarter of one percent accuracy or sensitivity. Worry about a ten-cent item in a million-dollar experiment. Fret about anything frettable.

All the while, the Viking rocket was ready to go . . . and in those days rockets were balky, unreliable, sensitive gadgets that had to be babied and coddled just to get them to work at all, much less to get another fraction of a percent of *anything* out of them. This gave rise to the cry from the rocket crew, the range operating personnel, and the project engineer, "Get them scientists away from that rocket and *shoot it!*"

I think we've got the same problem with our professional education system, our overall space program, and the solar power satellite program.

People who know anything at all about the way things get done will re-

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cognize the NRC opposition to the SPS for exactly what it is: people doing what they don't know anything about.

Get NRC off the job. Get Brown & Root, Stearns Roger, Babcox & Willcox, and other *engineering* outfits on the job. Remember von Pirquet's admonition.

Get them scientists away from the SPS and *build it!* ■

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a calendar of analog upcoming events

13-14 February
SCOUSE CON I at Liverpool Centre Hotel, Liverpool, Eng. Info: Roy Evans, 77 Selby Road, Orrell Park, Liverpool UK L9 8EB.

22-25 February
COMPCON Spring 82: High Technology in the Information Industry at San Francisco, Calif. Info: James Rudolph, Booz, Allen, and Hamilton, 525 Middlefield Road, Menlo Park CA 94025.

8-12 March
General meetings of the American Physical Society at Dallas, Texas. Info: APS, 335 East 45th Street, New York, NY 10017.

10-13 March
3rd International Conference on the Fantastic in the Arts (Swanncon 3) at Florida Atlantic University, Boca Raton, Fla. Info: Timothy Sullivan, Conference on the Fantastic, College of Humanities, Florida Atlantic University, Boca Raton FL 33431. 305-395-5100 x2538.

19-21 March
LUNACON 25 (New York-area SF conference) at Sheraton Heights Hotel, Hasbrouck Heights, N.J. Guest of Honor—Fred Saberhagen; Artist Guest of Honor—John Schoenherr; Fan Guest of Honor—Steve Stiles. Registration—$11 until 28 February, $15 at the door. Info: Lunacon 25, P.O. Box 338, New York NY 10150.

25-28 March
AGGIECON, Texas A & M University. Guest of Honor—Roger Zelazny; Artist Guest of Honor—Vincent DiFate; Special Guest—Fred Saberhagen. Info: AggieCon XIII, TAMU, P.O. Box J-1, Memorial Student Center, College Station, TX 77844. (713) 845-1515, 8 AM-10 PM.

4-6 April
First Convention on Space Development at Hyatt Airport International Hotel, Los Angeles, Calif. Sponsored by the L-5 Society. Guest of Honor—Robert A. Heinlein. Info: L-5 Society, 1060 E. Elm St., Tucson AZ 85719.

27 June-2 July 1982
JERUCON (First International Integrative Congress on Science Fiction, Fantasy, and Speculative Science). Many world-famous SF authors will be in attendance. Info: Organizing Secretariat, Jerucon 82, P.O. Box 394, Tel Aviv 61003, Israel. (Use airmail.)

2-6 September 1982
CHICON IV (40th World Science Fiction Convention) at Hyatt Regency Chicago Hotel, Chicago, Ill. Guest of Honor—A. Bertram Chandler; Artist Guest of Honor—Frank Kelly Freas; Fan Guest of Honor—Lee Hoffman. Registration—$15 supporting at all times. Attending—$50 until 15 June 1982. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: Chicon IV, Box A3120, Chicago IL 60690.

—Anthony Lewis

Items for the Calendar should be sent to the Editorial Offices five months in advance of the issue in which you want the item to appear.

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"How much longer?" asked Archibald Block.

Feona Reynolds looked at her wristwatch. "Why don't you get a watch, Archy."

Archy spread his arms, so that his cuffs rose to display his bare wrists. "I don't wear anything on my hands or wrists. Wristwatches are symbolic shackles."

"Which means you must constantly bother other people to find out what time it is."

Hillary Speck, the third person in the room, said, "Oh, for goodness' sake, Feona." He looked at his own wristwatch, pushing a small button on its side. "It's thirteen minutes twenty seconds before noon, Archy."

"Did you perform that calculation in your head, Hill?" Feona said.

"As a matter of fact, this watch will display minutes to the next hour, as well as time, temperature, date, bank account, and other trivia. But I can do arithmetic, Feona. If that makes me somewhat a freak by modern standards, so be it."

Archy ran his fingers around the gate of the pneumatic mail chute. "All of us are terribly overeducated, or we wouldn't be playing this game. We'd be busy at Orgy or Contemplation like the rest of the idle rich."

"Better idle rich than idle poor," said Hillary.

"That's true."

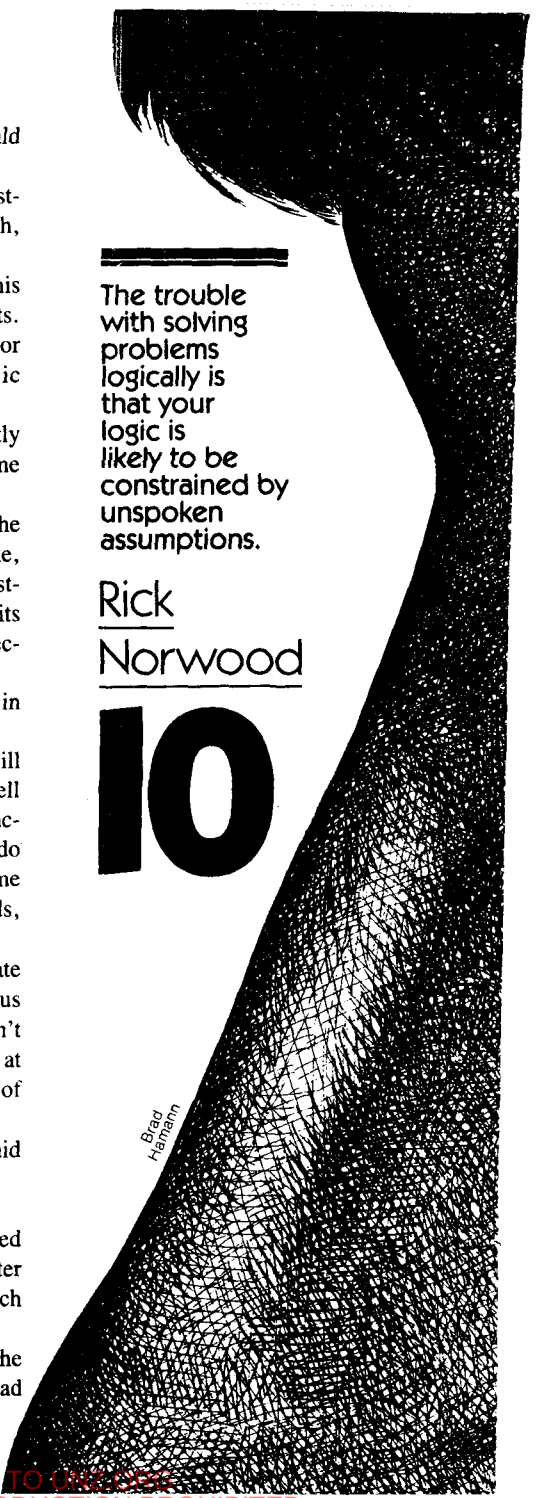
Feona yawned. "I, for one, am tired of being idle anything. I wish the letter would arrive." She looked at her watch again. "Eleven more minutes."

The three sat in silence or paced the floor. By mutual agreement, they had

The trouble with solving problems logically is that your logic is *likely to be* constrained by unspoken assumptions.

Rick Norwood

10



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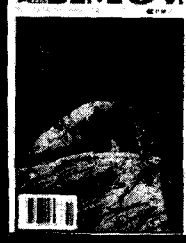

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arranged for the letter to be sent to the Washington Spaceport Hilton, so that no time would be lost between deciphering its message and catching the first ship to their as-yet-unknown destination.

Archy picked an apple from the complimentary basket of fruit and bit into it noisily.

"Three minutes," said Feona.

"Are we going to have a countdown?" asked Archy.

"What ships leave in the next—hour, say?"

"You are optimistic, Hill," Feona said.

Hillary, to answer his own question, sat down at the telephone and punched the appropriate buttons. The soft gray screen displayed the spaceport's departure schedule.

"Here's one for Ganymede that leaves at 12:02. Forget that. Let's see. Mars at 12:45. Pluto at 12:46."

"Make a note of that," Archy said. "If Pluto's our destination, and we miss that ship, it could be a week before the next flight."

Feona announced, "Eleven fifty-nine."

The telephone rang.

Hillary snatched up the receiver. "Who is it? I'm sorry, I can't help you now." He hung up.

"There it is!" said Feona and Archy, simultaneously.

A rectangular white envelope popped out of the mail chute into the rack. It had a twelve-digit address on the face, and a timed delivery stamp. There were no other markings on the envelope.

"Well," said Hill. "Open it."

Feona snatched up the envelope and

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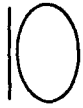
used a long, red fingernail to slit it along one side, pulling out a piece of standard typewriter paper, folded in thirds. She held it up by two opposite corners, so that everyone could see. Written in black ink in the center of the page was:



"Ten," said Archy.

"Is that all?" said Hillary.

"See for yourself," said Feona.

They were silent for a moment, and then all three spoke at once.

"The tenth planet."

"Ten astronomical units."

"The tenth ship to leave."

Another silence. "By the way," said Archy. "Who was that on the phone?"

"Can you believe it? Someone calling for Stewart."

"You idiot," cried Feona. "That could have been part of the clue."

"No. No, Feona, it doesn't work that way. The rules of the game are clear. The message in the envelope is the entire clue. No other clues are allowed."

Hill said, "You can see why it has to be that way, Feona. Otherwise, things could get hopelessly complicated. As it is, making out the clue is much more challenging than deciphering it. The clue has to be absolutely unambiguous, or you send the team off hundreds of thousands of miles on a wild goose chase. But it can't be too easy, or where's the fun."

"There's no need to be condescending, Hill."

"Hill wasn't being condescending, Feona. You're being defensive because it's your first game. It's Hill's nature to explain things. That's what he does best."

Hillary made no effort to stifle a broad smile. "I should hope so. It's the talent that will someday earn me an honest job, I hope."

"That's right, isn't it, Hill," said Feona. "You're serious about school. Not just passing the time like the rest of us old people. Wait until you're thirty. See if you're still smiling, then."

"Some people get jobs. Why shouldn't I be one of them?"

"We're wasting time," said Archy. "What does the message mean?"

"I already told you," said Feona. "It stands for the tenth planet from the sun."

Archy took the letter from Feona and sat down in an easy chair. "There are only nine planets."

"Don't you think I know that? Give me some credit. I've figured that out. Space pilots count the Earth/Moon as a double planet. That means Earth/Moon are planets three and four, which makes Pluto planet number ten."

"Neptune."

"Pluto. Neptune was the outermost planet when you were in high school, Archy. Pluto moved beyond the orbit of Neptune years ago."

"She's right, Arch."

"So, Pluto it is. And we've got to be aboard a ship that leaves in—yipe! Less than twenty minutes."

"Not so fast, Feona." Archy made no move to get up from his chair. "By the counting system everybody uses Pluto is planet number nine. I don't buy that business about the Moon being a planet. Even if it is, then it shares the

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number-three slot w th Earth. Mars is number four, Jupiter five . . ."

"I *can* name the planets, Hill. In that case, Pluto is number nine, and there is no planet number ten. So you tell me what the message means."

"From time to time," said Hillary, "there were reports of a tenth planet. I've seen an astronomy text from a century ago that listed Vulcan, a planet closer to the sun than Mercury. If Vulcan were number one . . ."

"But it isn't."

"There have also been reports of a planet beyond Pluto. It's even been named, once or twice. But nothing has ever come of it."

"I doubt very much that Stewart has discovered a new planet. It's something on the space lanes. Sit down, Hillary. Stop pacing."

"I think better on my feet. Maybe you're right. Maybe we should count moons. That way, Mercury is number one, Venus number two, Earth three, Luna four, Mars five . . ."

"Phobos and Deimos six and seven." Archy chimed in. "I get it."

"Should we count the asteroids?"

"No way! They're uncountable."

"Technically, they aren't," said Hill. "But I agree. Skip the asteroids. That makes Jupiter eight, and one of the moons of Jupiter will be number ten."

"Which one?" said Feona. "In what order do we count them? And do we count the little moons or just the big ones?"

"We have to skip the little moons for the same reason we skipped the asteroids. There are too many of them, ranging in size from a pea on up. Besides, the passenger ships never go there. Stewart will be somewhere we can get to. You can count on that."

"Obviously," said Archy, "we start with the innermost moon and work out. Now, the moons with spaceports are Ganymede, Io, Callisto and . . . what's the other one?"

"Europa. But I'm not sure what order they come in." Hill sat down at the telephone and depressed the ENCYCLOPEDIA key. After a few seconds, the key *lit up. He typed in "Jupiter, moons of."*

The display read, "Jupiter has four major and countless minor satellites. The major satellites, in order of their distance from their primary, are Io, Europa, Ganymede, and Callisto, (which see). They were first discovered by Galileo in . . ."

"That's it. The tenth object in the solar system is Europa."

"Well, what are we waiting for? When does the next ship leave for Europa?"

The two men did not move. "I don't like it," said Archy.

"Me, neither. It's too shaky. Throwing out the asteroids—some of which have perfectly respectable spaceports. Throwing out the minor moons—which we could get to, if we had to."

"Wherever Stewart is hiding, there is a comfortable hotel. You can count on that. What I don't like about it is, it isn't clever enough. Stewart always comes up with first-rate clues."

Feona plopped down on the bed and sighed. "Well then, you think of something."

Hillary noticed a blinking light at the top of the telephone screen. He pushed the ENCYCLOPEDIA button to turn the encyclopedia off, and a full-color pic-

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ture of a man's face faded onto the screen. It was the person Hillary had talked to earlier. He was wearing a conservative jacket and had a worried expression on his face.

Hillary picked up the receiver. "Hello."

"Sorry to bother you again, but it's really very important that I get in touch with Stewart Hall."

"Who are you?"

"I'm Charles Jewel, his stockbroker. It is most urgent that I reach him."

"Well, in a way, we're trying to do the same thing ourselves."

Feona got up from the bed and turned on the telephone speaker. "Let us in on this."

"I beg your pardon?"

Hillary hung up the receiver. "I'm sorry, Mr. Jewel. We really can't help you. I wish we could."

"Call me Charles. To whom am I speaking?"

"My name is Hillary Speck."

"I thought this was Mr. Archibald Block's room."

"I'm Archy Block. I'm off camera, but I can hear you."

"A mutual friend suggested that you might put me in touch with Stewart Hall, Mr. Block."

"Well, I can't. And we're pretty busy now, Charlie, so if it isn't a matter of life and death . . ."

"No. It isn't life and death. But there is a great deal of money involved."

"It's only money."

"Well, Archibald, some of a man's money may not matter much. But *all* . . . If all of a man's money is at stake, then the stakes are very high indeed."

You could hear a background hum of a distant typewriter drifting over the telephone speaker.

"All?" asked Archy.

"All," said Charles. "Now, will you help me find Stewart Hall?"

"Mr. Jewel—Charles—that's just the point. We don't know where Stewart is," said Hillary. "We hope to know soon. But we don't know now. How soon do you need him?"

"Before the stock exchange closes."

"Five?"

"Four. Four PM Eastern Standard Time."

"May I ask why this is so urgent?"

"I'd rather not go into details. But it is very important—to Stewart. His whole financial future is at stake."

"My God," said Feona. "He'd have to give up the game."

"Beg pardon?"

"That was Feona, the third member of our team."

"Team?"

"Have you ever played 'Planets'?"

"I can't say as I have."

"It's a game. Rather like 'Hide and Seek.' "

"Hide and Seek."

"Yes. Only you have the whole solar system to hide in."

There was a long silence.

"Are you telling me that Stewart is off-planet?"

"Well, I wasn't exactly telling you that, but, yes, I have every reason to believe . . ."

"Good God!"

"Wait now, you can still reach him by telephone."

"If you knew where he was. But with the whole solar system to hide in . . ."

"There's a clue."

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"A clue?"

"Yes. When you play Planets, you leave a clue behind. Otherwise the game would be hopeless. And pointless."

"And what clue did Stewart leave behind? I am right in assuming that Stewart is your quarry?"

"Right as rain, Charlie," Archy called from his chair.

Feona took the piece of paper from Archy's hand and held it up to the telephone. "This was the clue, Charles. The number ten."

"That's it?"

"That's it."

"Are the clues in your game usually that abrupt?"

"Not at all," said Hill. "I've seen clues that were cryptograms, acrostics, stories, mathematical formulas. But I've never seen a clue like this."

"That's Stewart for you," said Archy.

"Stewart was one of the best. You see, it is easy to leave a hard clue. Anyone could concoct a clue that no one could solve. The hard part is to leave a clue that leaves you baffled for hours and then, all of a sudden, it's so obvious that you can't see how you missed it. I have a hunch that this clue is one of those."

"Could it be the tenth planet from the sun?"

"First thing we thought of. There isn't any tenth planet from the sun."

"You say it might be hours before you solve this."

"Yes."

"But when you solve it, you'll know where Stewart is, and I can call him there. Will he take the call?"

"I think so. Chances are he will be registered in a hotel under his own name. Of course, some planets have thousands of hotels. Usually, a clue gives a particular hotel. This one, though—I don't know. How much information can you cram into a two-digit . . . wait a minute . . . I've got it!"

"What?"

"I've got it. I've solved the puzzle. Why should this be a base ten number? It must be a binary number. And 'one zero' is binary for two. Venus. The second planet."

"Do you mind telling me what you're talking about?"

"Listen. The number system we use is based on ten, because we have ten fingers. The right-most digit counts as one—one, two, three, four, five . . . The next digit counts as ten—ten, twenty, thirty, forty . . . Binary is another number system, used a lot by computers. Instead of counting for ten, the second digit only counts for two, so 'one zero' is binary for two."

"I didn't understand a word of that. It sounds too much like mathematics to me," said Charles.

"It is mathematics."

"I hate mathematics. Anyway, you say Stewart's on Venus. Where on Venus?"

"That's right, Hill," Archy said. "If 'one zero' does stand for Venus, it doesn't contain enough information. There must be hundreds of cities on Venus. Also, Venus is a rather unpleasant place. Nothing but hard-hat types and computer programmers. Their idea of a luxury hotel is one with a swimming pool and a color T.V."

"It can't be that bad."

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"My main point, Hill, is that a single binary number doesn't give enough information, at least, not about Venus. If he were on Phbos say, then knowing that would be sufficient information.

"It *looks* like binary," said Hill.

Feona leaned closer to the phone. "Charles, if time gets short, start calling every hotel on a planet or moon or space station which has only one hotel."

"Listen," said Charles. "Do you mind if I come over there?"

"We aren't supposed to have outside help."

"I doubt very much that I'll solve the puzzle before a panel of experts does. I just want to be there. Besides, there is a lot more at stake now than just a game."

"I wish you would tell us more about that."

"I'll tell you when I get there."

"Are you in Washington?"

"Boston, but I can be there in an hour. Washington Spaceport Hilton, Room 9383, right?"

"Right."

"My personal number is 981-0131-181-2180. Call me in transit if you get it figured out. Good-bye."

The screen went dark.

"Well," said Archy, "anybody got any ideas?"

"Have you?" asked Feona.

"Ten AU," said Archy.

"AU?"

"Astronomical units," explained Hillary. "But in which direction? Now I have an idea. What if this isn't a ten at all." He picked up the piece of paper. "What we have here is a straight line and an ellipse. The ellipse stands for a planet's orbit, obviously." He turned the paper various ways.

There is only one hotel on Phobos. But Venus? Besides, if 'one zero' is two in binary, then it's three in base three, and four in base four . . . It could stand for anything by your reasoning."

"You work on that. I need the telephone."

Hillary relinquished his chair to Archy. He was lost in thought.

"An astronomical unit," Archy said, half aloud, "is the mean distance from the Earth to the Sun. A distance of ten AU defines a sphere about the Earth with a ten-AU radius. Now the odds are astronomical, no pun intended, that any planet or moon lies exactly ten AU from Earth at any given time. So . . ."

"Why AU?" asked Feona.

"Because kilometers are too short and light years are too long."

"Did you stop to think that he might be in Room Number 10 of this very hotel, right here on Earth?"

Archy did not answer. He was punching buttons.

"Saturn is the only planet that is ever exactly 10 AU from Earth. It goes from 8.5 AU to 10.5 AU. Now let's see where old Saturn is right now . . .damn! 9.4."

Hillary looked up from what he was doing. "There are some asteroids that far out."

"Hm. There must be some way to program this thing to run a search on present distances of Trans-Jovian asteroids. But it will probably be twice as hard and take ten times as long as need be. Stupid machine! Now, let's see . . ."

For a while the only sound in the

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room was an occasional grunt or shuffle of feet.

There was a knock at the door. Feona let Charles Jewel in.

"Any luck?"

"None so far. You got here fast enough."

"Not much traffic in the southbound tube. Can I see the clue?"

Hillary handed it over. The desk where he sat was covered with crumpled note paper.

"This is it."

"Yes."

"Then I've got it."

"You what!"

"I've got it. Now, if you people are serious about not wanting outside help in your game, I suggest you step out into the corridor while I use your phone."

"But . . ."

"I know. I've got a lot of nerve. This is your room. But I assume Stewart is your friend. And time is short."

Baffled, the three stepped out of the room. They had only paced the red-carpeted hallway for a few minutes when the door opened.

"You can come in now. Everything's all right."

"You've talked to Stewart?"

"Yes. I got his voiceprint order to sell stock, relayed it to the New York Exchange. And he's in the clear. He asked that the game go on as if nothing had happened. And he told me to keep my mouth shut. He did suggest that, to make up for barging in on you like this, I put the tab for this room on his account, which, with your permission, I will do."

"But the clue. How did you figure it out?" said Archy. "No! Don't tell me. But how could you get it when we couldn't?"

"I think I know," said Hillary. "I was right. It is one of those clues that are so simple, they're hard."

"I've got it!" said Feona.

"Of course," said Hillary, "I've got it, too, now. Archy?"

"I'm still in the dark. What is it?"

"Let's give Archy a few more minutes to think," said Hillary. "I'll check when the next ship leaves."

"I want to know what this stock business was all about," said Feona.

"Are you three actually flying off into space after Stewart?" said Charles. "I assume you can afford it. But every time business takes me off-planet I'm scared witless from liftoff to touchdown."

Feona laughed. "A spaceship is as safe as a nuclear reactor. You just got finished traveling hundreds of miles, at hundreds of miles per hour, with traffic, zipping in and out of a crowded tube. Now, that's dangerous. You trusted your life to the mathematician who invented pneumatics, and I bet you can't tell me his name."

"I know. But I'll keep my feet on the ground, thank you. Anyway, about the stock. I forgot to ask Stewart, but I guess I can tell you. Do any of you own shares in the Luna Corporation? No? You're lucky. Stewart had all of his money there. After all, what could be safer? I found out this morning that an old treaty has come to light that will tie up the Luna Corporation in the courts for years. The stock may be worthless. It will be all over the screen tomorrow.

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I was able to get my own clients out from under just in time."

"Isn't that information worth a lot of money?"

"It could be, if someone wanted to use it that way."

"Will you stop talking stock market already!" Archy shouted. "I give up. Tell me. What does 'ten' mean?"

"It isn't ten at all," said Feona. "You both told me Stewart was one of the best. What could be gutsier than for him to write out his destination in plain English."

"I don't . . . of course! Io, the moon of Jupiter; how could I have missed it?"

"And Io has just one hotel: the Spaceport Hilton."

Hillary jumped up from the telephone. "Charles, thank you for your offer. You take care of the room. It was nice to know you. Come on, gang. We have a spaceship to catch." ■

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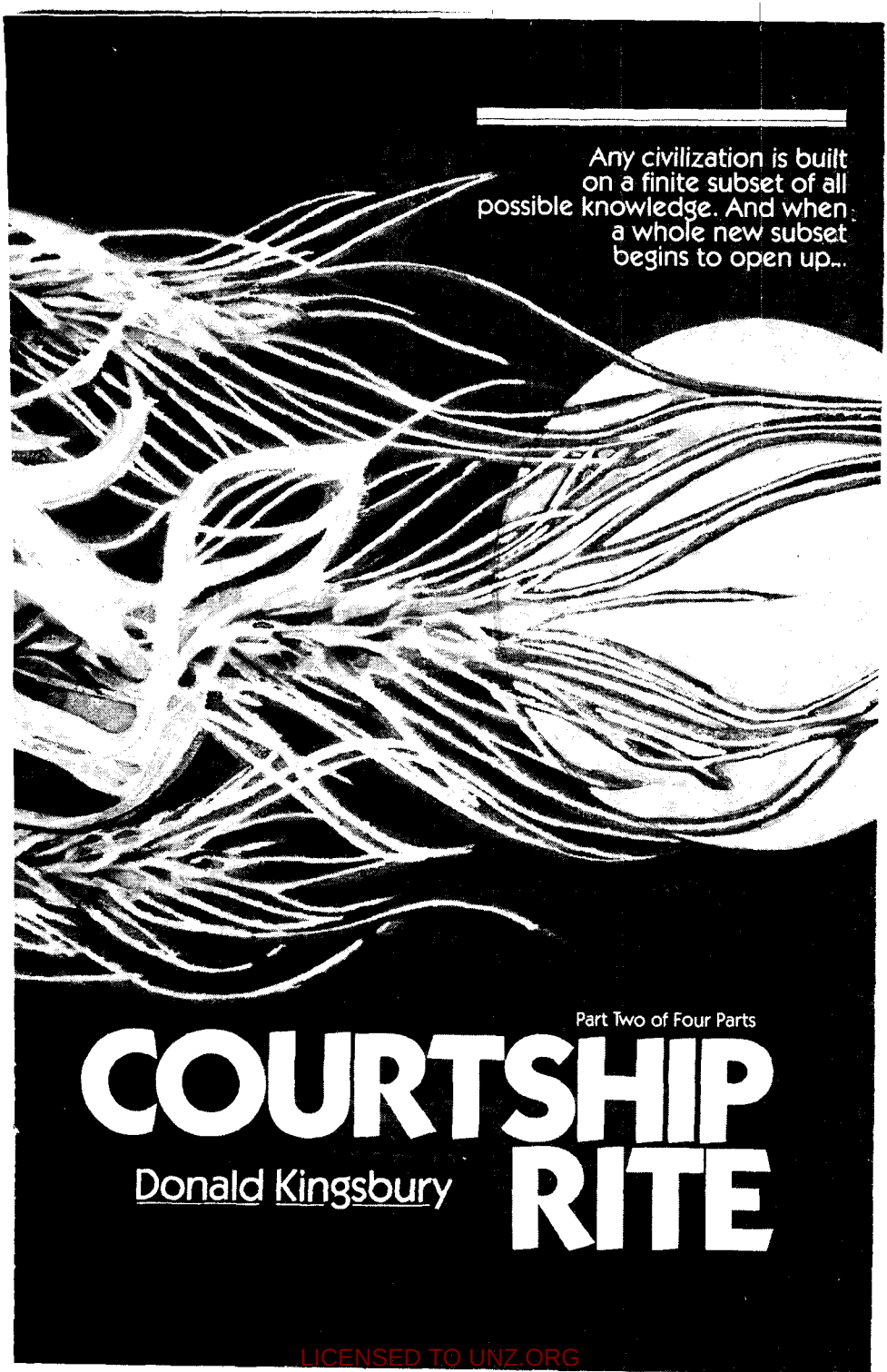
Any civilization is built on a finite subset of all possible knowledge. And when a whole new subset begins to open up...
Part Two of Four Parts
COURTSHIP RITE
Donald Kingsbury

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Seven times a day He passes overhead. In the religion of the Race it is **The God of the Sky** *who long ago carried sacred life to the profane planet Geta to save the Race from the Unknown Danger. God has since chosen silence so that the Race might learn from its own acts. All knowledge is subservient to biology. All leaders are biologist-priests. All religion stems from genetics which alone is able to guide survival on a world deliberately chosen by God to be harsh enough to breed the kind of 'kalothi' needed to master the Unknown Danger.*

Clans dominate the life of Geta. Non-territorial underclans breed themselves to perform defined services—the Ivieth to pull loads and build roads, the o'Tghalie to be mathematicians, the Nolar to farm, the og'Sieth to create machines, the n'Orap to tattoo and trade, the oz'Numae to weave, etc. Territorial priest clans control biology and rule, vying with each other to fulfill the Chant which predicts that one clan will unite all of Geta. In the region of the Wailing Mountains it is the Kaiel who rule.

The maran family, which consists of the brother-husbands **Gaet, Hoemei,** *and* **Joesai,** *and their co-wives* **Noe** *and* **Teenae,** *are courting* **Kathein** *so that they may transform their marriage into a complete Six. Kathein is a Kaiel turned physicist whose main effort has been directed to the extraction of information from a single crystal which has come to be known as the Frozen Voice of God.*

The clan leader of the Kaiel, Prime Predictor **Aesoe,** *disapproves of this match, coveting Kathein himself, and insists that the maran Five, who are subject to his will, marry instead the powerful but clanless heretic* **Oelita** *from the coast, even though she is an atheist. The coast is ruled by the Stgal, and charismatic Oelita is their most powerful enemy. Political advantages would acrue to the Kaiel by making an alliance with those opposed to the Stgal. Oelita is called the Gentle Heretic because she does not believe in violence and abhors the system by which the priest clans call up the low in "kalothi" to be eaten during times of famine. She is unaware of Aesoe's plans for her.*

In defiance of Aesoe, the maran send Joesai from the city of Kaiel-hontokae down through the Valley of Ten Thousand Graves to the coast to challenge Oelita by the Seven Trials of the Death Rite, hoping to kill her so that they will not have to marry her. Teenae is sent with Joesai to balance his violence and secretly plans to carry out a less drastic plan of her own which both will give the maran Kathein and give the Kaiel strategic advantage on the coast.

Meanwhile the seagoing Mnankrei, eying the weak Stgal, covet the same coastline of the Njarae Sea as do the Kaiel. Storm Master **Tonpa** *happens to be in the coastal port of Sorrow when Joesai first tests Oelita while hiding behind false clues which cast all suspicion for the initial death trap upon the Mnankrei. Tonpa, furious, captures Teenae, tortures her, and exposes the Kaiel plans for the deceit that they are—but only as a cover for his own deceit. He is going to burn the main*

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granary so that the Stgal will be forced to buy Mnankrei wheat.

16

The fei flower that traps the pregnant geich female savors but briefly the eggs of the ferocious geich larvae waiting within her abdomen.

Proverb of the Stgal

The base of operation of Joesai's group had been shifted from the inn at Sorrow's waterfront to their cramped ship. Below deck Joesai quizzed his smaller wife with the skeptical thoroughness of a professional and the gentleness of a devoted husband. His man, Eiemeni, who was an expert in the Bnaen technique for cueing memory recall, helped him with questions by the glow of a bioluminous bulb. It did not seem probable that Teenae had her story right. Why should the Mnankrei risk burning a Stgal granary while they were negotiating to supply the Stgal with grain?

Teenae grew impatient. She felt free to abuse her co-husband because he was bigger than she was. "You play the doubting fool when you could be sharpening your knife. We must warn the townspeople and lead an ambush. We'll make up for the stupid way you treated Oelita, the cruel way you treated your *betrothed*."

A rueful smile played across the scars of Joesai's decorated face while he remembered the fiasco that had led to his wife's capture, torture, and disgrace. "At the present moment I wouldn't be believed if I accused the Mnankrei of washing their bums in seawater. Maybe next week."

Teenae was calmer now. "I told you exactly how they are going to attack and when. That is what is important; not what people believe!"

"You told us what *Arap* told you," said Eiemeni, not disguising his opinion that Arap was an imaginative underseaman.

"You're still angry and want sudden vengeance," said Joesai.

"Of course, I want vengeance!" Teenae raged.

"Vengeance is a waiting game for those able to control passion."

Sensing a stone wall, the tiny woman changed tactics. "That's why I have chosen *you* as my instrument!" With playful grin she took his arm as if she needed his protection. "I'm just an overemotional woman and would spoil everything." She paused. "That's why you have to look out for me," she added petulantly.

"Ho!" he said, feeling her tease and trying to edge her back toward reason. "It is not *logical* for the Mnankrei to burn a granary now. It would make the people of Sorrow suddenly forget the great virtues of the sea priests."

"The Mnankrei could blame their deed on us," she suggested wickedly.

Such a sobering thought prompted him to take her story seriously. He sent her away and four of his counselors analyzed the tale she had been told aboard the three-masted freighter. In the end they decided that it was probably the invention of a boy trying to impress a beautiful woman, but to be on the safe side they had to assume it was true.

Joesai left a small crew in their ship

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and sneaked the rest of his men out onto the peninsula within striking distance of the granary. He deployed them efficiently. None of his watchers were in sight, but they could maintain patrols that kept the coast impenetrable. Any small waterborne vessel that might attempt to beach itself could be captured within a matter of heartbeats.

Scowlmoon, fixed in the sky, overlaid six times as much of heaven as did Getasun. At sunset it was darkly huge but as the night progressed and the crescent expanded from its evening sliver, the moon began to cast considerable illumination. On the moonless side of Geta a surprise maneuver under cover of night might have been possible—but not here. By halfmoon Joesai was ready to believe that it was already too bright for an attack. Either sea-priest Tonpa had changed his mind or the boy was a mischievous liar.

Joesai glanced at the granary and for no particular reason was staring right at it when the orange roiling balls of flame erupted. The flames had soared to four man-heights before he heard the explosion. Firebombs! His first impulse was to run toward the fire—until the horror of their situation struck his imagination. The clock-bombs had long been in place!

He had been keelhauled twice in one day!

There would be no Mnankrei about. But Joesai and his band were close to the fire and they would be blamed because there was no way to sneak back to the village without being seen. Thus it was emergency. They were heartbeats away from their lynching!

"Ho!" He was rising as he yelled. "Avalanche formation! Run!" The piercing cry from his caller's pipes echoed his order.

Fortunately, none of the angry people they might meet along their return route would know how to fight. Such were the children of the Stgal. And so nothing stopped Joesai's wedge until it reached a crowd on the stone wharf where their small ship had judiciously retired to a moat's distance. The ugly mob half-retreated as the wedge appeared but one braver group penetrated the Kaiel ranks. Joesai lunged to protect his wife, quickly catapulting the attackers into the water. He swiveled.

"Teenae!"

But Teenae was already falling with two stab wounds, crumpling, then pitching forward crazily. Enraged, Joesai and five men smashed the crowd back while simultaneously their ship docked, inflowing two men bearing the dying Teenae, then the other Kaiel in exact formation, and finally the rear guard, bumping the quay only once before casting off. With one reach of his massive hand Joesai retrieved the knifeman from the sea by his hair, tossed him to a subordinate, and turned to Teenae.

Eiemeni was tending her on the deck.

"Away, you meat-dresser. I'm the surgeon." Joesai had had hours of meticulous practice on rejected babies of the creche before they were sent to the abattoir. "I need a cloth!"

One was produced instantly from some back.

"I'm dying," came a feeble voice.

"How can you kill an o'Tghalie body?" he said gruffly, referring to a legendary toughness. She was from the clan of mathematicians and they had a

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way of locating superior gene combinations that was a clan secret.

"I'm weak."

"That's because you need a transfusion. As soon as I can plug Otaam into you, you'll get it."

"Dearest Joesai, even if you lose at kolgame every time you play, I'm glad . . . to have you around."

Otaam, who had her blood type, was spliced into her. He did not move while she slept. Joesai stood guard until the eclipse of Scowlmoon. No ships attacked them. He promised himself that he would someday bring her those leather boots made from the hide of Storm Master Tonpa. The flying-storm-wave cicatrice of the Mnankrei would be attractive on a boot. Silly, how he was willing to do anything for this strong-headed and rather foolish woman.

17

The carnivorous nota-aemini will never attack one of its own kind, and so that delicious beetle known as the false nota-aemini has prudently disguised itself to resemble its enemy. Yet life is too restless to allow a solution to exist for long.

Rial the Wanderer
as dictated to his daughter Oelita

Gaet rode the fifth model of the gossamer skrei-wheel through Kaiel-hontokae, attracting stares and a wake of children who followed him for blocks on end with their high excited laughter. The buildings rushed by and the children couldn't keep up and he kept to the streets between the hills of the city. He was thinking, as his three wheels took the cobblestone bumps, that if such vehicles became as common as footwear a man might not have to spend so much of his time away from his wives.

Ah, wives! There was his motive for hurrying! He was going to be glad to see Noe again. With Teenae away and Kathein interdicted and so much work to do, Hoemei and he had been reduced to near-celibacy.

Gaet left his skrei-wheel unattended outside the walls of the Great Cloister of Kaiel-hontokae. In a city where even the petty criminals were eaten and used for leather, theft might happen but it was no great preoccupation of the populace. The Great Cloister curved halfway around the base of a small hill, a formidable stone building. It was a Kaiel sanctum and the root of their technology. A faint odor of solvents was in the air. After kneeling in the sacrarium and offering a prayer to the God of the Sky, Gaet headed straight upstairs past an ancient stained-glass window.

On tiptoes he entered Noe's room, which was fully equipped because she, as did many Getans, maintained several residences. She was asleep on large yellow and blue dyed pillows that took the shape of her body. He thought that perhaps he would not wake her, perhaps he would just delight in being with her for a few moments and then leave. Hoemei had mentioned how short of sleep she was.

"Hello," she said lazily.

"I didn't mean to wake you."

"'S all right." She motioned with her body for him to come to her. "My nap is over. I need your shaft to wake me up." Slowly she pulled him under the

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blankets. "Mmmmm . . . you're cool," she said.

"You're warm. I feel like a loaf of bread being baked."

"Hoemei said you were making wagons. I didn't believe him. He said they were light enough for two men to lift."

"I can lift one myself. They're fast. We are going to have fifty of them built, maybe seventy, in time for the coastal famine—if I can find the craftsmen to provide more ball bearings."

She giggled. "Only Hoemei could get you to do underclan labor."

"Only Hoemei could get you to work at all," he retorted.

"I must say dallying beats administering the work of fifty juveniles fresh from the creches. The Cloister is a human pressure cooker! There is so much to do here!"

"Getting anywhere?"

"You can bet your coins we are! I have them working in ten parallel teams. They are terrified of me. They think I'm going to make soup out of them if they don't overachieve. Guess who saved us weeks of work?"

"I brought you some honeycakes in case you were awake."

"Is that all you ever think of? Making me fat so you'll have more to hold? You never listen to me."

"All right, who saved us weeks of work?"

She munched on her honeycake. "Our betrothed."

"Kathein?"

"No. Oelita. We were requisitioning samples of the wheat-eating underjaw and before we got the order out, they arrived by way of an itinerant glassblower. Oelita seems to be an observant woman. She collected some awhile ago and gave them to a renegade Stgal priest who breeds detoxified profane vegetation. He was worldly enough to send them to the Cloister here. Oelita also wrote out an amazingly detailed description of the underjaw life cycle."

"Do they contain human genes like Hoemei maintains?"

"They certainly do. It is an unbelievable crime. It's Judgment Feast for the Mnankrei. We'll have to break the whole clan to a lesser status, maybe destroy it."

"You'll wear Scowlmoon's crescent for a necklace before you see that happen. It's impossible. They tried it with the Arant and we're here."

Her eyes blazed. "We're Kaiel—not Arant!"

He laughed. "I see you believe our forged history."

"They let too many of you atheists out of the creches!" Noe was above all an aristocratic patriot.

Gaet did not bother to remind her that the creche had been essentially an Arant idea or that the God-made ectogenetic machines on which the Arant heresy arose had probably existed and been destroyed during the terrible crusade. Instead he changed the subject. "I figure Sorrow can hold out for one season against Mnankrei temptations. They have enough food reserves for that. If the underjaw is still an abomination by then, the Stgal are doomed."

She grinned smugly. "We already have the underjaw control ritual. It is not yet God-smooth, but it will be."

"That's fast work!"

"I'm a fast woman," she flirted.

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"We've synthesized three artificial control genes."

"For what purpose?"

"The underjaw carries up to a hundred tiny symbiotes in its cervical carapace which are its only source of the alalaise it needs to power its wings during migration flight. When underjaws overgraze, the population begins to die. A dead underjaw triggers the sexual phase of the symbiote, whose larvae thrive on the corpse. In their winged phase they find living underjaws and, as the underjaws become symbiote-saturated, a migration begins. We've found a way to use the human protein in the deviant underjaw to trigger the sexual phase of the symbiote while the underjaw is still alive so that it is eaten alive. The larvae mature and find other underjaws. If the new underjaw is of the Mnankrei-synthesized variety, then the sexual phase begins again instantly. If not, the symbiote establishes a normal relationship."

"Clever. Who thought of it?"

"Me, you oaf!" She cuffed him. "When I was reading Oelita's description of the life cycle. Get dressed. I'll show you."

"I just got undressed!"

The labyrinth of the Cloister contained perhaps one-third of the entire Kaiel wealth. There were tapestries and windows and gold foil and silver inlay, of course, but that was for show. The major investment was in intricately crafted biochemical apparatus, dust-free and sterile rooms, electron eyes, silvergraphing techniques that could capture the image of a protein string on boronanate plastics. There were rooms where genetically truncated and modified microlife cells fabricated difficult chemicals. Priest-changed zi-ants performed much of the necessary micro-manipulation and sensing. Even among the priest clans where breeding and biochemistry was a familiar art, the Kaiel were known as magicians.

While Noe took a nap with her head on the desk top Gaet curiously examined relevant silvergraphs and pondered over hundreds of variations of hypothetical genetic chains that had been inserted in the fast-breeding symbiotes and tested. It was not his field of expertise but he read the group's work well enough. In the Getan language the same word was used for "priest" or "leader" or "biologist." Nobody survived the creches who was not a fine biochemist.

"Hey, this one seems to work!"

She woke up and looked to see the source of his enthusiasm. She smiled proudly. "We're still optimizing it."

"You're sleepy."

"I need the mountain winds in my face."

"How about a run on my skreiwheel?"

"Is it dangerous?"

It was dangerous so she loved it, clinging to Gaet's back, flying faster than men could run. The ground rushed under her eyes like that peak risk moment when a sailplane comes in for a landing, but there was no jolt or collapse of wings—the earth kept slipping past in endless orgasm.

18

Whether you be saint or fiend, those

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you touch, through time and persistence, will eventually be successful in doing to you what you have so casually done to them.

Dobu of the kembri,
Arimasie ban-Itraiel in "Rewards"

Teenae woke at dawn. Blood-red Getasun bathed her from its perch above the mountains with hands that rippled redly over the bay. She examined the pain of her wounds with her mind. "I would drink blood for my strength," she said, meaning the blood of her assailant.

Joesai was brooding at the deck railing. "Is that wise?" he counseled. "This man is one of Oelita's people. She showed us mercy. We can return mercy. Tae ran-Kaiel once said that you can only hold a land where you have more friends than enemies."

"I do not forgive a man who tries to kill me," Teenae replied angrily. "I wish to see his generous offering to the Race so that the Race may be purified."

"Revenge should wait until your pain has healed."

"No."

Joesai shrugged. "It will be dangerous to bring him on deck and to give him a knife he might throw at you."

"The obvious continually eludes you," she said impatiently. "Strap the knife to a mat so that it cannot be thrown. Leave one arm of my assailant free to rub his wrist against the blade."

And so they carried to her the youth bound upon an iron-reed frame. Joesai, in his role as priest, invoked the ceremony in the expected musical monotone. His bearing changed. He spoke for the Race.

"We did not have kalothi. We died of the Unknown Danger." The pain of the Race was in his voice. Then his voice became resonant until it challenged even the sea. "And God in His mercy took pity and carried us from the Unknown Place across His Sky so that we might find kalothi. We wept when He gave us Geta. We moaned when He cast us out. But God's Heart was stone to our tears. Only in a harsh place beneath His Sky might we find kalothi. And only with kalothi shall we dare to laugh our laugh in the face of the Unknown Danger."

Joesai brought out the priest's Black Hand and White Hand, each with special scars, each carved from wood and mounted on short rods. He held them above his head so that he became long-armed. "Two Hands build kalothi." With a vibrating sound that was half formal laughter, half formal grief, he meshed the wooden fingers together. "Life is the Test. Death is the Change. Life gives us the Strength. Death takes from us the Weakness. For the Race to find kalothi the Foot of Life follows the Road of Death." The small ship heaved upon the waves. No land, no sea on Geta was immune from this ritual.

Joesai's voice was implacable. "All of us contribute to God's Purpose. All of us help distill the racial kalothi. Some of us are here to give Life. Some of us are here to give Death. Of these the greatest honor is to contribute Death for we all love Life." He paused for only a moment but in that moment spliced irony into his monotone. His gaze was upon the youth. "It is with awe that I accept the offering of your defective genes."

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"It is against the Code to kill," said the youth serenely.

"Oelita's code, not mine!" snarled Teenae with such a thrust of hatred that her wounds stabbed her again.

"It is against the *Kaiel* Code to kill," the boy sneered.

Joesai silenced Teenae with a piercing glance before she could reply a second time and returned his eyes to the youth. The Black Hand and the White Hand slightly askew, he answered in a voice that was more vengeful than priestly, "Of course. And we shall not kill. We are only here to *receive* your offering."

"I have no offering for you."

Joesai continued the ritual, unperturbed by such blasphemy, bringing forth from his robe certain sensual delights which were the Receiver's obligation to the Giver. They were simple delights, for this was only a ship, not a temple. There was pure water, the touch of smooth glass, a shave, the taste of a berry. Each was refused.

Then came the time for the Cutting of the Wrists. But the youth defiantly held his fist away from the knife. Joesai placed the blood bowl. His men began the Chant of the Blood Flow, harmonizing like a giant heart in vigorous pulse, a heart whose beat began to slow and fade until it drifted away in silence. The youth laughed, proving he was still alive, but no man noticed because to them he was already dead.

Carefully, as if the Cutting of the Wrists had indeed been performed, as one would if he were planning to tan and shape and sew a fine leather coat from the hide of a corpse, Joesai began to skin the boy, unmindful of the surprised and then terrified screams that carried across the water and into the hills of Sorrow. The skinning was hardly begun before the boy's pain and fear took his wrist against the knife that had been bound into the mat. He cried out for mercy, for the skinning to stop until he had had time to die, but Joesai did not stop.

The butchering went quickly. No part was wasted. The meat was salted or hung in strips to dry, glands were set aside for medicines, tendon and gut preserved, the bones went into a soup. A bowl of blood was presented to Teenae as her due.

Eiemeni, who had come to admire Oelita, expressed his regret as he washed the blood from his body in the sea, with Joesai, beside the wooden bulk of their ship. Joesai was unmoved as he sudsed his hair. "He chose to approach Teenae by *my* rules while he expected *Oelita's* rules to protect him from reproach. Oelita lives by her rules and is protected by them. For her I have sympathy."

They showed Teenae the hide as they stretched it for drying. She fingered the especially well-cut wheat stem cicatrice of the heresy. It would make a fine design on a leather binding for her copy of Oelita's book.

Oelita!

A thought startled her, causing her pain because her whole body reacted. "Joesai! I forgot! In all the excitement I forgot to tell you that Oelita owns a Frozen Voice of God!"

19

The Wheel of Strength has four

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spokes—loyalty to Self, loyalty to Family, loyalty to Clan, loyalty to Race.

It has been said that Self is the first loyalty, for if the Self is not whole can we build a Family? can we build a Race? But I say to you a selfish human is a one-spoke wheel soon broken, a fool trying to move the boulders of Mount Nae by himself.

It has been said that Family is the first loyalty, for if the women and children are not protected can there be men? But I say to you a Family of selfless humans, who stands against their Clan while exploiting the Race for the sake of their children, will not roll far.

It has been said that loyalty to Clan is the first loyalty, for is it not the Clan which moves mountains and brings its terrible force against evil? But I say to you a Clan dominated by loyalty to itself will destroy its families and perish.

It has been said that loyalty to Race is the first loyalty, for without genetic purity can we hope to meet the Danger? But I say to you the Race is heartless without its Clans and Families and Selves.

The Wheel of Strength has four spokes—each equally weighted and balanced or there is no strength at all.

Prime Predictor Tae ran-Kaiel
at his first Festival of the Bee

Kathein had never met Aesoe before. She did not know what he looked like, for whenever they had been within sight of each other—and once she had been as close as an arm's reach—he had been gazing at her and she had dared not return the gaze. She could feel his fascination deep in her loins as a face can feel the sun that eyes must turn from. She did not know what to make of this summons to his country residence. Servants had bathed her and dressed her and a wet nurse had been provided for her tiny son.

Kathein could not even look at Aesoe now as she made her entrance. It was with relief that she knelt in formal bow to touch her head upon the stone-cold floor. Music was playing—gentle strings, a reed. She had watched the musicians briefly with eyes that were avoiding his.

They were of the Liethe, small beauties shrouded in fabric woven from the soft wings of the hoiela, blending unobtrusively into the tapestries of the room. They sold themselves for gold to the priests and were valued for their rarity, but they were not slaves. If a Liethe left her master another always came and took her place.

Aesoe's three Liethe had the same face and body. Rumor spoke of parthenogenesis. It was said aloud that any man who was served by a Liethe became all-powerful. It was whispered that they garroted their sons. Whatever their ways or powers, they played enchanting music.

An iron-strong hand lifted Kathein's chin. "I've wondered about the color of your eyes. I've only seen the length of the lashes." She saw a man's face wrinkled with laughter. He was old but he had all the grace of a blacksmith in full swing. He was Prime Predictor because the prophesies he had registered in the Archives as a youth had been more accurate than the vision of any other Kaiel.

Aesoe awed Kathein. She, whose greatest skill was the making of predic-

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tions in the simple world of light and stone and bouncing atom, could not even approach his ability to see and control the future. Half of a prophet's strength was his ability to monitor a prediction and *make* it come true. Aesoe was one of her gods. The God of the Sky was a comforting protector. Aesoe she feared.

He took her hand. "I've done you grievous harm," he said, "but I have no regrets."

"I am too close to my sadness to understand."

"Sadness is a disease of youth."

"You're never sad?"

"Never."

"I'm sad."

"The maran-Kaiel family is expendable. You are not. That is the whole of it."

"How can you say that about them!"

"Hoemei I would hate to lose. The sun may rise on the day he becomes Prime Predictor. I could manage to say pleasantries at Gaet's funeral without gagging. There is nothing I can do for Joesai. An impatient eater falls into the soup pot, goes the proverb. To lose Noe would cause a scandal in those circles where scandals are most quickly forgotten."

"And my beloved Teenae?"

"I don't know if I am fond of Teenae or not; I've never slept with her."

"You're callous!"

"I'm generous. I'm giving them Oelita. They can make use of that opportunity and reach the coast for us and be gloriously successful. Or they can fail and be destroyed. You, I dare not endanger with them. If our population was twice as large as it is, and twice as bright, I might risk you."

"Then I can bargain."

He smiled. "As long as it has to do with physics and not love."

"There's a machine I want built."

He laughed. "A mere machine? I had intended to give you far more than that. You will be leading your own clan."

Was he jibing her? As a child she had drawn her own clan cicatrice and even now wore it between her breasts. It was an impossible dream, but to hear *Aesoe* offer it made her heart pound, even if he was only cruelly jesting. "That is not yours to give," she said with formal rebuff. Only a Gathering could create a new clan. As the Gathering of Ache had created the Kaiel.

"In the history of the clans, which clan was founded without a Gathering?"

"There is no such clan."

"The Liethe."

She searched her mind and found nothing, only tale and mystery and fear. "There must have been a Gathering."

"No. One woman created the Liethe. And so it shall be again. You can have whomever you want—up to a hundred bodies—as long as they are crafty and have a bent for physics. Your assignment is to duplicate your own peculiar mental edge—and sharpen it if you can. I have predicted that the Kaiel shall win all of Geta if it is possible to true-breed your abilities. That is why I cannot risk your affair with the maran-Kaiel who perhaps are lovable but who are not worthy of you."

He must be demented. Was this how senility suddenly attacked? She stared at him in amazement. "You cannot . . ."

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"I can! I am a Gathering of One!"

Kathein dropped to her knees again—weakly—and touched her head to the floor. "The honor is too much."

Quickly he knelt beside her and took her bowed head in hands that had held women. "How pleasant to see you no longer sad! Perhaps we will have time to share our mutual interests on the pillows?"

She was totally confused. "Is that why you've brought me here and offered me my soul's desire with a plan that must defy all of Geta, because you lust me?" There was sting in her voice.

He lifted her to her feet, undisturbed by the anger. "It is uncanny to be the Prime Predictor. I see Kaiel power born through your womb—the vision is clear—but who knows if that is a future I see because I'm a prophet or because my lust for you drives me to create it? Who knows? Not I." He was amused.

Kathein fled from him. Safely in her room, she barricaded the furnishings against the massive door and lay on the bed sobbing out her love for Joesai, the father of her child, and tender Gaet and shy Hoemei and Teenae whose kiss was as soft at the hoiela wing and Noe who loved her. It was hopeless. The most powerful man on Geta had seen her body and desired it.

20

A message to Oelita of the Gentle Heresy from Joesai maran-Kaiel:

I was impressed by the style in which you faced the Mnankrei Tonpa while being true to the code you have forged for yourself. You gamed with Death and won. How could I not count that as the second of seven trials? You have earned my respect. Someday, if you live long enough, perhaps I shall earn yours.

Oelita crumpled the note that had been penned in high script on fine blue paper and delivered anonymously. She threw it across the room at the four advisors she had convened for a council. "Manyar!" she raged, "the Mnankrei and the Kaiel are crushing us like a nut between the arms of a nut cracker! We have to fight! It is too soon!"

"It is always too soon," said Manyar, pulling his robes closer to his body.

"And you, Eisanti, is that all you have to contribute, bland homilies that serve no further purpose than to keep the high-day conversation sparkling? The Mnankrei offer us food while the Kaiel improve the road through the mountains. The famine isn't even here yet and the death-beetles are already laying their eggs!"

Eisanti played nervously with his bracelets. "Manyar is right; we cannot take such a rigid stand as yet. The tree bends until it is thick enough to resist the wind."

"*Tomorrow* the Stgal are calling for the first of the Ritual Suicides. We *have* food! We don't know how much the underjaws will devour! We don't know how much food we can buy!"

Old Neri interrupted. "O'Tghalie Sameese has calculated that there will be less death if the Stgal begin now."

Oelita flared. "Of what use are the numbers the o'Tghalie manipulate? If you have measured the breadth of your field wrong it does not matter that you

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have the length correct, for you will not be able to calculate your acreage!''

''Perhaps she is right,'' said Taimon from the back of the room. ''Perhaps the Stgal find this the opportune time to eliminate their opposition.''

''It is our weakness,'' added Manyar, cleaning his nails, ''that we attract the low in kalothi.''

''That is our strength,'' retorted Oelita.

In the end, as she always did, she made her own decision. She waited until her council had dispersed inconclusively. Her fists were clenched. It was a shock to her to discover that because they all had high kalothi they weren't motivated enough to oppose the priests. But how could she form a council of the low in kalothi?

Her final decision was impulsive. She walked out into the town of Sorrow with only two bodyguards, down where the old buildings began, and pulled together a fearful crowd of those who had the most to lose, melding them into a group large enough so that they might find courage in each other while she led this mob toward the Temple.

All the Village of Sorrow above the waterfront was temple grounds. The Path of Trial wandered tortuously about the Temple itself and up over the hill above the Temple, twisting between the garden settings, each of its obstacles crafted to challenge the swiftness and strength and flexibility of some part of the body. Here the Stgal tested the physical kalothi of those who came under their jurisdiction. The Temple itself, built like a crescendo in this serpentine garden, began as a modest star that grew until the points of the star became halls dedicated to the Eight Sacred Foods and, continuing inward, transformed themselves into massive stone buttresses that rose majestically to support the tower that held at its pinnacle the rooms of Ritual Suicide.

Inside the tower the gaming rooms spiralled around a shaft of air, seemingly supported by the light that laced through the colored glasses of the tall, narrow windows. There a Getan might play kol and chess and games that could not be won without sharp eyesight or steady hand or creative mind or color sense or ability to leap the obvious. Unobtrusively the Stgal priests kept score so that one's kalothi rating could be updated. Inside a temple a Getan was gambling with his life and loving it.

Nearing the immense facade of Sorrow's great Temple, where they had been defeated so often, some of the bawdy spirit that Oelita had infused in her mob began to vaporize. Here was the focus of their lost self-esteem. One man tripped and another made a loud joke about his friend's clumsiness. Oelita posted them in front of the main portal with instructions to be vocal about their protest, but when she was gone they hung back and took on the nature of a crumbling wall of bricks that busy people pass without a glance.

Oelita was welcomed into the inner sanctum of the Temple as an honored guest by the highest of the Stgal priests. They had been expecting her and received her with outward warmth. She was given cushions and drink and encouraged to talk. She spoke eloquently of opposition to both the Mnankrei and the Kaiel, and urged restraint in calling a condition of famine. There were other

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ways. There were other foods. Vaguely she had some of Nonoep's profane triumphs in mind. Oelita built her strategy on an appeal to Stgal vanity—they were as good as the Mnankrei and as good as the Kaiel, and cleverness could defeat their opponents.

The Stgal listened, drew her out, laughed with her, and finally, without explanation, had guards take her up to a room high in the tower. It was said of the Stgal that they would feast you with great camaraderie, waiting until the dessert to poison you. She could see her people down below. Till dusk she watched, and with the setting of the sun they melted away.

Her tower room was more than comfortable. Here the kalothi-weak were pampered to honor the sacrifice they were to make for the Race. The Lowest on the List spent his last night with everything a Getan valued—clear water for the throat and incense for the nose and tastes for the tongue from the stamen of the hug flower and the chanting of a choir of friends and a mate to please the body. Still, the window was barred. From this window, they said, no more exalting sight ever met a human's eyes than the last transit of the God of the Sky across the stars.

Was it illusion to think that words would ever raise people to action? *The first crisis, and my words collapse like a sand city cut down by a single wave.* What was loyalty? What made men stick together in good and in bad? *I thought I knew.*

It was against the rules that she be here. She had the highest kalothi rating in all of Sorrow. And then she laughed through the bars at the night sky. The rules were to be broken, as every kol master knew—if you could have the consequences of the broken rule.

She found herself staring through the bars vacantly, thoughtlessly, waiting, waiting for God. And when God passed overhead, she laughed and cried. God was a stone. When you were brought up among a whole people who believed in God the Person, some of His Morality remained a part of your soul. God the Stone had no morality. Even knowing that, she had never really felt it before. She was here because there was no morality. God was a stone. That's all there had ever been.

And Oelita wept.

21

A secret shared is no longer a secret.
Saying of the Liethe

The caravan of a hundred and twenty men stretched along the Itraiel desert. Behind them lay the mountain range called The Pile of Bones and, to their left, the implacable Swollen Tongue. Here the land was flat or gently rolling, but greener, though the vegetation was never more than waist high.

Three massive Ivieth clansmen pulled the wagon in which a small hooded woman rode. Her secret name was a secret. Her line-name was recorded as se-Tufi'87 but she was known less formally as the se-Tufi Who Walks in Humility. Like every Liethe woman, Humility wore her signature in scar. Clones of the se-Tufi line were signed by seven nodules running from the base of each eye to the jawline like a string

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of jewels, and a bracelet of nodules on the upper left arm. Unlike the bodies of normal women, Liethe were uncut except for this signature.

By dusk the caravan made camp on a rise where the Ivieth maintained no permanent inn but did keep a murky well. Humility used her brass mirror in the shadows to retouch the facial makeup she wore to hide her almost scarless features under patterned artistry. It was taboo for a Liethe to reveal her clan while travelling without priestly protection. She ate rations of biscuit and honey and stringy roast Ivieth from the leg of the porter who had died, and then wandered ahead to spend the last of the evening by the fire, her cowl over her head against the sudden cold.

As if it were a slowly rising cookie in the sky's oven, the moon had nudged above the horizon, day by day a little higher. It was exciting. She could not imagine what it was like to have a moon in the sky since she had lived all of her life on the far side of the planet.

The giant porters laughed so. They enjoyed their songs so, and so she could not resist snitching a small harp and singing to them one of their own ballads. Liethe Code would not permit her to sing a Liethe song. Liethe music was for the priests. She threw her melodiously high voice farther than the reach of the fire.

On the Mountain Kaemenek
A wildish road claws steep incline
Where I take rest
To overlook the Drowned Hope.

Gusts of fury lashing by,
And drifting clouds maraud the sky.
I hold my cloak
Above a Sea of Drowned Hope.

Swift the blooded circle-sun
Quick quenches all its daytime heat
And boils the Sea
To reddened rush of Drowned Hope.

I'll not see this sight again,
Nor ever come this way again,
But I'll take rest
In song of spume at Drowned Hope.

They arrived above Kaiel-hontokae before dawn. She left the wagon and walked toward the moon, hypnotized. Even the stars dimmed in its glory! It lit the land! She had a shadow at night, a pale extension of herself that disappeared down the road! Great Scowl-moon brought music to her feet and song to her heart. What a night for loving in a landscape erotic with the soft red pallor of reflected sun-death. Ghosts of aqueducts stalked along the horizon toward shadowed symmetries of far buildings.

Finally she begged one of the Ivieth to let her ride on his shoulders. She was scarcely a burden for him. She was such a small thing, clinging to his hair, her legs crossed upon his giant chest. *Ho!* she thought as they mounted the crest of a hill and glimpsed distantly the cadaverous ovoids of the Kaiel Palace celebrated in song but never seen, *mine enemy to be my lover!*

The cell she was assigned in the Liethe hive at Kaiel-hontokae had been built within the buhrstone walls of an old whisky cellar. There was floor for a sleeping mat and upright space for simple wooden furniture—but no tapes-

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tries, no luxuries at all. She woke early, prayed, and to clear away the mood residue of dreams, assumed the mental attitude of White Mind while placing her body successively in the Three Positions. She allocated a sun-height of time to her memory drills, today a review of two songs and the mnemonic key to her genetic file. Then, unhurriedly, she went to work.

She took out a spray of pale blue flowers she had plucked in the desert, the petals, rimmed in purple, fragile now but still brilliant. There lurked a poison rare enough that it was unrecorded in the literature. The petals, when sun-dried and leached in alcohol, yielded a sweet essence so powerful that drops of it could kill a man. It numbed like one whisky too many, filling the body with a rosy warmth, a pleasant drunken stupor, and then the heart stopped. Assassin's Delight was the only name by which she knew the flower.

The Queen of Life-before-Death uncorked a flask of pure ethanol and dropped flower fragments down the throat. Fascinated, she watched the blue dissolve. It was a transparent blue that matched her secret name. Tomorrow she would begin the distillation.

A face sneaked into her room, giggled, and retreated. Humility leapt up, barefooted, still bare-breasted, and peered down the hallway. "Hey!"

The face reappeared, cloaked in robe and also with bare feet. *Her* face with bare feet. She giggled. Humility's clone sister smiled in reply. "The se-Tufi Who Cocks Her Ear," said the woman, cocking her ear in formal introduction.

"The se-Tufi Who Walks in Humility," came the formal response coupled with the flat hand and the drop of the eyelid gesture that was universally associated with humility. The Liethe of the same genetic line used these quick signals to recognize each other.

"Would you like to break fast? Come."

The kitchen was austere, but there were bins of flour and potatoes and ample jars of ground bees and spices. "I'd like pancakes and honey."

They began to mix the batter and gossip as if they had always known each other. "Have you heard the fame of Aesoe? You're my replacement. I'm pregnant by him. This time it is a girl." She meant: this time it did not have to be aborted.

"I saw the full moon last night!" Humility was rapturous.

"Is *that* all that happens on a journey? Me, I'm afraid of rape."

Humility slid off her stool and, before she had turned around, began a forward thrust that took her into the air as a rotating ball which uncoiled, feet first, to hit the far wall with a devastating thump. She fell back into a cartwheel and landed gracefully where she had begun, on her feet. "You should see the look of surprise on a man's face when you smack him in the chest that way!" She went back to her pancakes.

Cocked Ear laughed. "Then you are prepared for Aesoe!"

"What's he like?" Humility was mildly curious.

Cocked Ear smiled a little laugh that made the beads of scars down her cheek part like a curtain. "You'll find out. Our crone is only giving you three high days to assemble your act."

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Humility's eyes widened. "So soon?"

"She's going to work you down to soup stock!"

"Don't we ever wear out?" The hive mother, Humility knew, was of the same se-Tufi line as they were. She was the notorious se-Tufi Who Finds Pebbles.

"No, we don't wear out, we just get bitchier."

Humility thought about that. The hive mother had lived five of Humility's lives. That was a lot of bitchiness. "Why the hurry?"

"The se-Tufi Who Sings at Night has been filling out Aesoe's threesome this week but she is to be sent south. That leaves only four of you for three roles."

"What kind of a kalothi-zero is this Aesoe? His ego is so big he needs *three* mistresses and for ten thousand sunrises he never notices that they are playing a shell game with him and he never even notices that they aren't aging? This is the man who overlords the Kaiel? This is the man who has delusions of grandeur that cover the whole land? The Mnankrei will skin him alive!"

"He likes to sleep with his head pillowed on your breasts. And he snores." Cocked Ear was enjoying herself.

"Recksh." Humility screwed up her face.

"And when he calls you Honeybee, that's your cue to snuggle up and suck at his ear lobe, all the time knowing that he thinks you are me while you are cooing at him!" her sister teased.

The crone appeared in the doorway, the first really older version of herself Humility had ever met. It was a shock. She was *old*. Humility knew well the map of her own line. This woman would be close to death—but her mind would still be strong, her ways demanding, and her energy relentless if economical.

"Your drill begins now," said the crone mother severely.

22

A man who never makes mistakes has long since ceased to do anything new. A man who is always making mistakes is a doomed man with swollen ambitions. But he who judiciously salts success with mistake is the rapid learner.

o'Tghalie Reeho'na in
"The Mathematics of Learning"

The small ship and its one-masted companion were anchored near an ancient breakwater that had been smashed by wave action. Joesai chose this refuge only because of an o'Tghalie clanhome in the mountains near the sea. Teenae had been carried on a stretcher up through the foggy woods and left with relatives to recuperate.

The astonishing revelation of Mnankrei intentions the night of the silo firebombing preoccupied Joesai. He was a man of action and never even considered waiting for orders from Kaiel-hontokae before planning a counterattack. His Death Rite obligation with Oelita was casked and stored in the whisky cellar to age; he knew priorities. The larger ship would go north under the command of Raimin on cautious reconnaissance. The swift three-man vessel he would take himself with Eiemeni and Rae. Later they would reunite for a more daring raid against the Mnankrei.

Joesai was anxious to bring back to

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Teenae her pair of boots but was wary of pitting his sailing skills against those of a seasoned Mnankrei priest. He was not yet sure of a strategy. Sinking wheat-laden boats headed south was appealing, but such a tactic was a double-bladed dagger since it meant starvation for those who did not receive the wheat. Judgmental errors of that magnitude tended to annoy Aesoe. Aesoe would steal the wheat and reship it. Joesai laughed.

In the meantime he had not forgotten Oelita's crystal. He was sure that it was only a piece of glass, but if perchance it was one of Kathein's Frozen Voices of God, it took precedence over any conflict between the Kaiel and the Mnankrei. The enigma of the Silent God was the most fascinating of Geta's puzzles, and an effort to examine this piece of the riddle was demanded.

A sudden storm nearly wrecked his too-small vessel on its way to Sorrow, delaying them a full day and smashing three of Eiemeni's ribs. A much sobered Joesai debarked for his covert mission. He wore a faint makeup that emphasized unnatural lines in his facial cicatrice so that recognition would be more difficult, but there was little chance of discovery along their devious route.

Oelita's house was perched on a hill with an easily defended back and no access to the front at all, or so it seemed—except to a man like Joesai, to whom the scaling of sheer stone walls was a minor climbing trick that required only a hammer and iron-reed spikes. Teenae he had quizzed in detail about the exterior and interior. She knew exactly where the crystal was kept.

All went as planned, but a quick search showed that much rearrangement had occurred since Teenae had been here. The crystal was gone. Nor was there time for a meticulous search. Joesai had no intention of alerting the outside guard, and so when his flagmen signaled the all clear, he retreated down the wall leaving his iron-reed spikes in place.

The three men regrouped in the street, moving not as fast as they might have because of Eiemeni's ribs. Stormwinds were still lashing them but they preferred the miserable weather because the clouds and rain and fog shrouded them and gave them an excuse to hide their faces behind wraps. Few villagers were abroad.

"We'll have to find out where she is."

"That'll be days. We aren't equipped."

Joesai was thinking of several inns where he might pick up some information but one with a small wheat stalk carved into its door struck him as ideal. He reconnoitered the streets for the best escape paths, and entered, dripping, holding his cloak close about him. He ordered a hot mead and when it came spoke casually to the barkeep. "Any more news of Oelita?"

"She's still in the tower." The voice caught. It was upset.

Joesai allowed himself a quick sip of mead. "A rough place to be," he muttered.

Before he was out on the street again, he had decided what they would do. "Rae, you're the strongest. Get back to that boat of ours and bring the spy's-eye. Eiemeni, I want you to lay out a path from the Temple tower that fades

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into the town. Learn every stone. We'll meet at Five Cross on the waterfront. I'll try to be back by the third highnode of God. If not, wait for the highnode of His next Orbit."

The Temple was lightly attended. Joesai had his choice of courtesans. He picked a small girl he knew was new to town, a pretty Nolar girl, probably a runaway. He asked for a quiet game of kol in one of the more expensive booths. Privacy was important after that silo-bombing fiasco. She was eager to please and he began a conversation with her, slowly.

Part of him was not comfortable trying to charm information out of such a lovely youth, but another part of him was long used to interrogating people —start them talking about what interested them, then get their speech level up to a chatter and listen. It wasn't long before she touched the topic of the fabulous tower rooms. She knew he wouldn't be touchy on the subject because she could sense instinctively his kalothi level, and the luxury of working with Ritual Suicides intrigued her.

"There's going to be some consoling for you to do up there," he said to keep her on the topic.

"A poor woman is in the north room already. I hear her crying every night. Why are they keeping her so long?"

"Have you served her?"

"Oh no. The north room isn't mine. I'm new and that's the finest room." She smiled ravishingly, and he felt her embarrassment.

He let her please him. The hot bath did wonders for knotted muscles that had been through a howling night of near death on the sea. Later, he paid his petite courtesan well so she would have no lingering doubts about her ability to please.

He knew most of Oelita's people by rote memory and picked from his mental files a burly ironsmith who was as gentle as he was big. When Joesai entered his smithy, the man was at work, his forge fire challenging the cracks of its prison walls.

"You!" The man raised a red-hot rod.

"I need your help."

"My help!" the man choked.

Joesai had chosen to reach this man through a judicious mixture of falsehood, truth, and bamboozlement. "Ho! You believe every lie the Stgal tell?" He knew the Stgal were well known for their oily versions of the truth. "Recall that it is the Stgal who have her under lock, not I!"

"You tried to kill her!"

"Are you sure?" He lied by indirection. "It is the Stgal who wish her dead. Wouldn't it be like them to direct blame elsewhere? And if there is a famine now, cannot they clean their streets of the infestation of heretics? Who knows who caused the silo fire?"

"Your woman confessed!"

"After being raped and abused and hung from a ship's mast all night! Do you call that a confession?"

The ironsmith returned his rod to the fire. "You were seen at the site of the silo burning." He waited with his hand on the rod.

Joesai snarled, releasing emotions he was certain would not betray the truth. "Would *I* plan a clumsy raid in broad sight? For what gain? The Kaiel have wheat and cannot sell it to you because

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of the mountains. Recall that when the silo was bombed, the Mnankrei were negotiating to sell wheat to your Stgal! Perhaps two infamous clans plotted this together—the Stgal to rid themselves of your like, hoping to betray the Mnankrei later; the Mnankrei constructing a betrayal of the Stgal to gain dominion over the coast. My wife overheard the Mnankrei scheming to burn your silo and we scoffed at her but prudently deployed ourselves to prevent such an atrocity, failing in a way that made us look both guilty and foolish." He did not wait for a reply. "Do you wish your Oelita out of the tower?"

The smith's eyes were narrow with suspicion. "No one can escape from the tower."

"Give me iron spikes and a rhomboid jack. Do you have that? I need nothing else to get away with the preposterous feat of stealing our heretic away from the Stgal!"

23

She who comes from an ascetic place can relish pleasure, for what can give more contrast to pleasure than denial? She who comes from an ascetic place can wield power, for discipline has made her the master of those pleasures sought by power.

From the Liethe's "Veil of Chants"

The drills of the Nine Tier Matrix of Understanding went on for sun-heights, alternating between Action Mode and Thought Mode. Other se-Tufi who had been with Aesoe took over when Cocked Ear tired, but Humility was not allowed to show fatigue. It was like learning an intricately choreographed dance so that, should a dancer be replaced, the audience would never notice. The grueling workout exhausted her, a sacrifice to Liethe perfectionism.

After dinner, six of the girls were singing or playing to relax. Humility, who craved only her cell, was summoned by the respected hag. The old crone sat in her luxurious room on a huge round pillow that she used as a bed. Two beeswax candles burned on her silver-inlaid desk. Behind her was a rich tapestry celebrating the pleasure of laughter. Stoicism was for the young.

Humility was not sure whether she should remain standing or take a cushion. It was macabre to be confronting herself at the end of her life, as if her travels across the Pile of Bones and the Itraiel Plain had taken her on a journey in time to meet herself as she would become. No words passed between them. Finally the crone mother rose, and Humility ached to help her stand on those legs, but one did not help a crone mother unless asked. The woman took her by the arm, on the band of signature, and carefully brought her to cushions near the candles. Her gesture said that discipline deserved pleasure. She poured liqueur into two tiny goblets, carefully, for her hand trembled. These unspoken moments gave Humility time to work the White Mind. The day vanished. Her body relaxed. In the whiteness appeared her urgently central concern and she spoke first.

"The Kaiel and Liethe are traditional enemies."

The old woman smiled mysteriously. "You are anxious to work?"

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"What is my assignment to be?"

"My child, your first assignment is patience. Think no farther than the five pleasure points of Aesoe's penis."

Humility was somewhat offended. "I am no novice to stand while Geta turns."

"So I have heard. Your reputation is one of consummate skill. But do you know why you do what you do? Be sure in your own mind that it is right. Only you will bear the consequences. Whatever the Liethe do in secret, in public they side with local law."

"I need only to be competent. I take orders from those wiser than myself."

The old woman sighed. "Tell me, why are the Kaiel and the Liethe enemies?"

The Queen of Life-before-Death had nothing to say. The enmity was an understood.

"You see, you are Action Without Thought. Aesoe does not even know we are traditional enemies. He thinks of us as mere women for hire and a bargain at the price. He is more fond of us than some men are of their wives. Vengeance is only in the Liethe soul."

"The Kaiel are mass murderers."

The se-Tufi crone sipped her drink, and trembling, set it down, emotion shaking her frail body. "Yes? That is something which touches you?" She spoke her question searchingly, as if she did not understand what Humility was talking about.

"The Judgment Feast of the Arant," said Humility warily.

"That was ages ago. I believe I am correct when I state that there was no Kaiel clan at the time."

"The rubble under our feet is Arant! This whole city is built on the bones of the slaughtered Arant! Dig down! You'll find their cellars. You'll find the treasures they hid before they were wiped from the face of Geta! The Kaiel clan was founded so that the Arant would never rise again! The Kaiel were given Arant territory and Arant coin and they took it, thus they have the blood of the Arant in their bellies!"

"I see," said the old woman as if she were blind. "Why does that concern the Liethe? We seek only two things: beauty and the power that beauty brings."

"Have we not avoided Kaiel-hontokae like the poison? It is part of our tradition! It has always been important. Why did you bring a Liethe hive here? I assumed it was to attack." Of course it was to attack—the hag was leading her on.

"You speak of the Arant rubble beneath our feet. Do you know the old Arant name for this city?"

Humility spent some time accessing an unused part of her mental files. "D'go-Vanieta."

"What does it mean?"

"Nothing."

"Repeat d'go-Vanieta. Keep hammering the word with repeats until you break off the rust of the old speech. Change the inflection."

Suddenly Humility was giggling.

"Ah," smiled the old woman, "you have it!"

"God's Vagina?"

"Now recall the Innkeeper's memoirs where Liethe was confronted by the sailor who brought her to the island of Vas."

"She said she came from the Vagina

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of God. But she was only teasing the sailor!''

''I doubt it.''

''You think she was Arant?''

''I feel she was born here, yes. But Arant? No. I've been doing research at the various Kaiel libraries. People are willing to tell their inmost secrets to a dying old woman,''

''*I* would not tell you my secrets!''

''And *I* would not tell you what I am about to tell you but that you are se-Tufi like me and I know you and have foreknowledge of what you shall become. I do not wish to die with my most unpopular opinions unshared.'' She paused, wheezing before she spoke again. ''I believe Liethe was a servant. I believe she was ugly and unloved by men.''

''Mother!''

The crone was enjoying her minor heresy. ''I believe she was an ignorant servant who worked in Arant basements doing routine cloning work, day after day.''

''The Arant never knew how to clone! Only the Liethe know cloning!''

''We have no information about the Arant except what their enemies said, and their enemies all agreed that they were great biologists. In point of fact the Kaiel know how to clone; they have always known how to clone but make minor use of the technique.''

''Where did you find this out?''

''Here in Kaiel-hontokae. You don't think all I do is suckle young girls!''

''The songs speak of Liethe as the most beautiful of all the Liethe.''

''The songs would. She left no writing, she left no research, and she was abysmally ignorant of genetics. She had no husbands. She spent her time cloning herself and it was not she, but three daughters of her clones who codified our ways. She left us with a page of comment that is singlemindedly obsessed with beauty and power. Think! Who would have a goal to be beautiful and to use her beauty to dominate the most powerful men?''

''A Liethe!''

''That is not the right answer, child. It is an easy riddle.''

''I don't know the answer.'' Humility was slightly antagonistic.

''Consider an ugly woman without charm who is ignored by men. Might not she have a raging desire to create the kind of beauty and image that would dominate the men all women desire?''

''I'm *not* ugly and I *do* dominate men!'' Humility was defiant.

The old woman smiled, recalling herself in her prime. ''And you do *not* have the *goal* to be beautiful and dominating. You *are* beautiful and dominating. Perhaps you dream about living longer than any se-Tufi has lived. Perhaps you dream of finding the man who can father a daughter who will found a great line with a better heart than your own. Perhaps you look for the ultimate poison. One's goals only reflect what one does not have.''

''I came here to kill Kaiel.''

The crone mother nodded. ''So did I. And I found the most vigorous priest clan on all of Geta. They may break the stalemate. They have a magic ear which can go anywhere on the planet in a single heartbeat. They have delicate instrumentation beyond belief. Did you know that a Kaiel can do genetic surgery on a chromosome while it is out of its cell? Do you know what that means for

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us? We could forge sister lines that differ by single gene groups!''

''Do you think the *Kaiel* will be the instrument of God's will to unite Geta?'' This was a somewhat horrifying thought for Humility.

''No, my child. They came on the scene far too late. God's command has already been carried out.'' The smile of wrinkles was there again. ''Which clan is represented in every major city on Geta? Which clan has achieved access to all policy decisions and is present when they are made?''

''Mother!''

The hag cackled. ''How easy it is to rule when you sneak into power as a man's possession. We're not a priest clan. Who would have suspected us? Who would have opposed us? What could seem more harmless than a woman for hire?''

''But dear crone, we just lay them! We flatter them, and play them off against each other and, seeming to obey, make them give us what we want. . . .'' Her eyes widened.

''Go on.''

''But that's not ruling a planet! There has to be policy. We'd have to be making momentous decisions!''

''Like which priest clan shall win Geta?''

Humility scoffed. ''We aren't going to do that! We're going to side with the winners. We're going to ride to power in their beds!''

''And what of the Timalie? That clan of priests who abhor erotic women? Would we allow them to win?''

Humility burst into the great laugh. ''They haven't got a chance!'' She stared at herself as she would be five of her lifetimes from now. ''Mother, I think you are serious!''

''Of course I am serious! But don't think I am impressed with our power. We did all this without knowing we were doing it. Our relative strength is great on the planet as compared with any priest clan, but it is as if we commanded a bee's brain in a human body. What could be more pitiful than a human whose brain takes all day to send a message to his hand? Rule and hand go together. We may be stronger than anyone else, even the Mnankrei, but we are weak. We must use our position, build on it, or in a single generation all could be lost.''

Humility scanned her ambition and pride. In a sudden flash, it seemed trivial, bloated. ''Will I ever be humble?'' she cried.

The old woman took the young girl and brought her down on the bed, holding her head against a dried bosom and caressing the flowing hair of youth. ''Not if you grow up like me, you won't.'' She paused. ''You have beautiful hair but it's dry from your trip. We have superior hair tonics here in Kaiel-hontokae.''

Humility was sleepy. She struggled to get up, to wake up, to get back to her cell where she could sleep.

''No, no. Stay here. Your journey was enough asceticism for a purification. A night with me in this little room won't spoil Aesoe's Palace for you.''

''Why did you bring me to Kaiel-hontokae?''

''I need an assassin. I'm too old for that kind of job.''

But Humility was asleep.

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24

If one is wary of an enemy bringing gifts, can there ever be the union of mankind under God's One Sky?

The lonepriest Rimi-rasi
to the Gathering
That Honored God

The squeak woke Oelita to a sudden sitting position. Panic located the intermittent noise at the window. Then she saw the screw between the bars, happily turning and pausing in an erratic fashion, pulling together two heavy nuts that were, in turn, pushing a rigid framework against the bars, bending them, slowly breaking their stone base. A bar snapped loose and the machine sagged. "Shall I reset it?" she asked the sky, bewildered.

"Ho," came a voice on the wind, "that would save me a nasty trip. Any guards?"

"They're asleep."

"Is the bent bar free?"

"I think I can work it free."

"Don't drop it outside . . . make a racket to wake God!"

"Where are you?"

"I'm the beetle on the windowsill."

For thumping heartbeats she said no more, but just reset the screw and removed the loosened bars. "Are you coming inside to help me?" she asked weakly.

"No. You're coming outside to help yourself."

"I'll never get down!"

"All you need to do is crawl out the window and gravity will take it from there."

"I hate your sense of humor!"

"Ho! I thought this was a good time for levity."

She had no choice. Her heart was racing and she began to crawl out the window, clawing for a grip that found only smooth stone. When she saw the man above her, she froze in terror. It was Joesai, the Kaiel murderer.

"Ready for Trial Three?" He was grinning in supernatural stance on a ledge above her.

"I'm going back inside."

"Death's door. Your choice."

She was paralyzed. "You'll kill me!"

"No," he grinned. "Won't have to."

She took the harness he lowered to her, made from the hide of some poor pauper. It fitted around her waist and under her crotch. Iron rings were sturdily woven into the belt. He showed her how the ropes attached and how to walk down the wall with her weight being held by a piton, but mostly the wind took his words and she had to reason out the process. Once he screamed because she was doing something wrong but it was too late and a piton gave away and all the security of the rope was gone. She fell. Terror. But the second rope went taut and she was slammed against the stone. She never even paused. She just secured herself and called up the signal. "Ready! Go!" When they reached a ledge on the first large buttress the terror came back again.

"In Trial Four you have to climb *up*." He laughed the great laugh while they shared this ledge built for one and a half.

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"Why don't you just push me off!" she replied savagely.

He waited patiently. He waited longer than he wanted to wait. "You've shown at least half of the courage you need to get down."

"In a Death Rite Trial, you shouldn't be helping me."

"I'm not carrying you on my back!"

They reached the roof. He lowered the ropes and harness to a strategically placed lackey. Then they jumped. The waiting small crowd had robes for them and they faded into the town. Joesai indicated a gaming tavern up a side street. "Ho! I have thirst after such a climb!"

"No," Oelita protested, pulling at his robe.

"You really think the Stgal cowards will come after you now?"

"They were going to murder me!"

"Never. They were merely working on a ruling to give you special permission to contribute your known Ainokie gene to the Great Chromosome Sink." Joesai laughed, picked her up and carried her into the tavern.

He set her feet down on the tile floor while their companions swarmed up the stairs behind them, then made a flourish to the startled customers. "May I present the Gentle Heretic!" And he took her arms roughly, and, stripping the sleeves from them, held her arms up, wrists out, unslashed wrists, in the universal gesture of high kalothi. The barkeep was weeping. Both drinkers and gamers cheered, raising their mugs.

"I don't understand you," she said. "I don't understand your morals. I don't understand your beliefs, even your loyalties. Is it possible that we might stop your little game and start perhaps a friendly bout of chess?"

"I always lose at chess."

"I noticed."

"Life is a race to outwit Death."

"No, it isn't. Life is peace if you create that peace." She looked him in his eyes and saw the transit of a dark moon across a green and alien planet. "Peace?" she implored.

He laughed. "Till tomorrow!"

When they took her home, Joesai's two men commanded a patrol of men who checked out every intersection and alley and doorway before they moved forward. It was while they were waiting at a corner that Oelita got impatient and peered around Joesai up the street, touching him, her hands holding one of his arms. She wondered then if she could seduce him. Who else of strength did she have to rely on?

There was Nonoep. But he was Stgal, dreamy, amoral, self-centered, finicky about detail to a point where he lost track of deadlines and schedules. He would make a huge batch of jam and forget to have pots to put it in. She laughed, remembering.

Perhaps if Joesai were with her, organization of volume profane food production might be possible. She could keep him close to her. Surely a man would not harm a woman who pleased him. Of course, Joesai had his wife. She was recovering from her wounds somewhere and he would go back to her. *I liked Teenae. Teenae liked me.* Perhaps the four of them?

Whatever was done, had to be done soon. Once the sea priests came with their wheat and their administrators, it would all be over. It frightened her to

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be trusting the Kaiel. They were just as violent as the Mnankrei.

When her guard arrived home she simply ignored the pandemonium of the neighbors finding her safe. She showed Joesai the incredible view through the pale green windows overlooking the Temple.

"Teenae enjoyed it up here," he said.

"She told you?"

"Yes."

"Is she well?"

"She's chattering again. She was telling me about your insect collection and that little crystal you have."

"I remember that the crystal impressed her. She called it a Voice of God. You Kaiel are such superstitious people!"

"I find it superstitious to think of God as a rock. May I see the crystal? It is probably just very nice glass."

Oelita was indignant. "It is *not* glass!" She went and brought it. "The place was such a mess when Teenae was here."

Joesai took the crystal reverently and she could see his excitement. "It *is* a Frozen Voice of God."

"What does that mean to you?"

They were interrupted by the entrance of the ironsmith who had made the pitons for the tower climb. Joesai greeted him warmly and set down the crystal and took Oelita to him. "I can't believe you're safe," said the huge man, moved almost to tears. Their eyes locked fondly. When she looked around again, Joesai was gone and so was the crystal.

There was no way he could have passed through to the rear of the house. He had to be on the balcony. Outside she noticed the iron-reed spikes running down her front wall, but only because she had just mastered the descent of the tower-facing.

She wheeled around, returning to the house. "That man!" She was furious. "Thief! God's bane! He's a liar!" she stormed. "Maiel! Herzain! He's taken my crystal!"

One of her friends came forward. He was of the iron-reed dredgers. "No need to chase him. I know where their boat is beached. It's the most likely place for them to go."

She brought out a blowgun, a device not known in Sorrow but given to her when everyone thought she needed protection. Oelita had liked the darts because they were effective and harmless. Distillate from the fur of the ei-cactus knocked a man down within four heartbeats but the paralysis was only temporary.

She set up an ambush on the beach and nobody came. Her temper subsided and she was becoming more aware of her own danger and the necessity to leave Sorrow when suddenly the three of them appeared, feeling quite safe. She felled the youth with the broken ribs immediately. One of her men grabbed Joesai and she stung both him and her own man. The third man she pricked while he was being held by the iron-reed dredger.

She recovered the crystal and had the three Kaiel tied up. It amused her to bind them with a puzzle knot that could only be undone by the victim who had time, patience, and perception. She ordered their boat repaired. The storm had damaged it extensively and the sail was ripped. When she saw Joesai painfully flexing his fingers, she sat down beside

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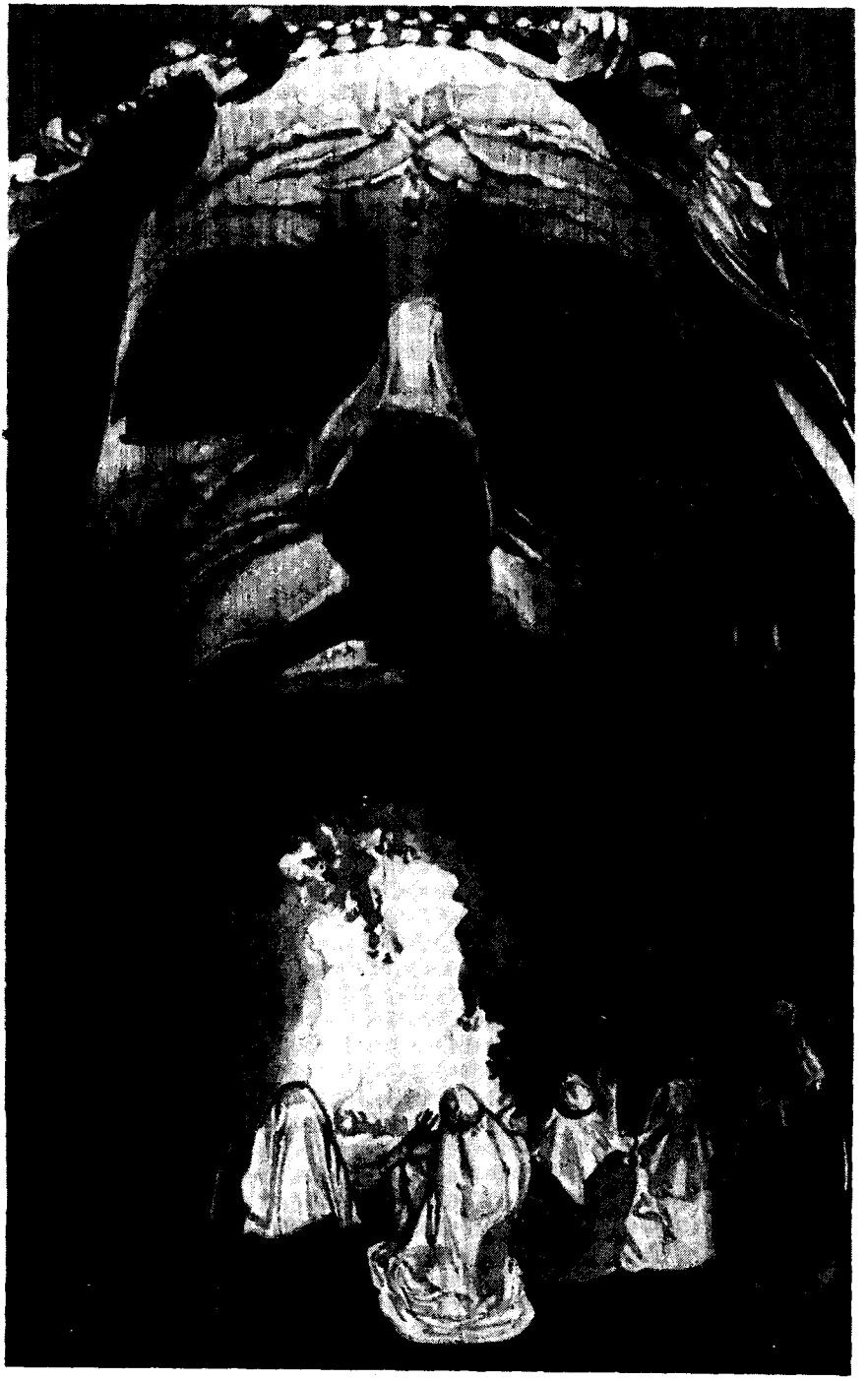

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him, unmindful of the gravel beach that cut into her knees.

"That's Trial Four of the Death Rite! Do you understand?"

He muttered an unintelligible reply through a reluctant tongue.

"If I attack men who are as dangerous as you, I risk my life. That counts! That's Trial Four!"

She cried. She was afraid of death. She was afraid for her people. But like a squall that brings rain, sudden hope lashed over her desert despair. Joesai had made her less afraid of trial. *I'll be brave. I'll convert the Kaiel.* She trembled as she had when the men closed in on her at Gold Greek and as she had when she actually made the decision to crawl down the outside of that tower wall. *I'll go to Kaiel-hontokae.* She could use the crystal as hostage for her safety. Somehow that bauble was important to her enemies.

25

There is a saying that in the western regions of the Kalamani Desert only a stone has kalothi.

Dobu of the kembri,
Arimasie ban-Itraiel in "Triumphs"

Reading over his old predictions, ineradicably and forever a part of the Archives, Hoemei was appalled by his naivete. Aesoe had taught him like Tae had taught Aesoe, and he had imitated his master, not always grasping the direction of Aesoe's vision. Now suddenly he was seeing with a new clarity.

The rayvoice project had been a shock. Aesoe believed in a Geta where authority was centralized in Kaiel-hontokae. For such a structure to be viable, rapid communication to and from the city was a necessity. Yet Hoemei had established only forty-five rayvoice stations, and the information flow was already unmanageable. He was now sure Aesoe had miscalculated the complexity level of a centralized government by orders of magnitude.

Hoemei's visions came erratically, in dreams, perhaps suddenly in the middle of a conversation, often in full color. Sometimes as he sat over his papers by candlelight, well past his bedtime, he heard Getans from many futures discussing trivial problems of their day. He saw strange machines whose purpose half baffled him.

When he disciplined his strange vision to peer into the specific future that would use Aesoe's map of a united world, he saw, sluggish as the armored ice worms of the far south, a huge social creature ridden by vast clans who moved rivers of information with little real effect. The images disturbed Hoemei because Aesoe's cause had been his world, too, his avowed goal.

An o'Tghalie friend calculated for him that a reasonably nimble central government, with modest responsibilities, might require hundreds of times as many decision-makers as there were citizens. Hoemei had been astonished. Prediction, it seemed, was treacherous when one embraced the fuzzy pictures that lay beyond the range of one's myopic eyes.

He used an increasingly focused vision to sift through centrally governed futures, sometimes a dozen alternate Getas a day, each of which had been

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founded on different organizing principles. The clogged snarl of their cultures finally drove him to find wider worldscapes. From those visionary travels along the bewildering branches of far tomorrows he brought back a simple conclusion.

Too much *local* authority leads a region's priests to maximize local benefits sub-optimally at the expense of distant peoples. *Central* authority, which theoretically maximizes benefits for the whole by gathering and using *all* information, in practice quickly becomes so choked that wisdom breaks down and again leads to far less than optimal solutions. Gathering information from any large area at a central location, and there correlating it, takes longer than the useful life of the information.

Between the two extremes Hoemei saw many balanced worlds. Slowly he began to formulate his "short-path" theory of government that forever changed Getan history. There was a way to construct the decision nodes of a network so that the most optimal path tended to cause the atrophy of less economical ones. Nodes had to be connected in such a way that there were *no* unique paths to the top of the hierarchy. A man maintained his power within the system only by being on the most effective decision route through the multiple pathways leading to a solution.

Hoemei had much help from his o'Tghalie staff. His basic model was a modified version of information flow theory which described an evolving biological ecology.

The amount of work Hoemei was learning to handle in one day was extraordinary. His coworkers hesitated to bother him and so when a clerk of the Clei, that indispensable underclan, entered the inner sanctum of Hoemei's office, he bowed deeper than usual because of the gravity of the interruption. "Yes?" Hoemei was curt, even though he knew that no one would enter here without having considered the urgency of his cause.

"We have just received a rayvoice message concerning Joesai."

"Is he all right? And news of Teenae?"

"The information was relayed by our Soebo station, maran." He spoke that half-formal form of address with another bow, reluctant to go on. "The message lacks completeness," he said trying to soften the blow, "but it is unpleasant. Here is the transcript."

Hoemei scanned the paper in great leaps. A Kaiel ship had been captured by the Mnankrei and brought to the port at Soebo. The identity of those manning the ship was not available but it was a number consistent with the party Joesai had taken to Sorrow.

Hoemei's fear exploded as anger. "He's supposed to be in Sorrow playing dandiman!"

"Joesai is an unusual priest, maran. He may have disliked the role of dandiman and taken it upon himself to investigate odors drifting from the north."

Hoemei slumped. "That's my brother." *Oh my God, and they will have Teenae, too.* The report did not say they were dead, but a clan willing to starve thousands for political advantage would not be a kind captor. With a will he quenched himself—hot iron to steel. Death. Life had always been thus. A Getan protected himself with a

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large family so the loss would never be as great. But two of his mates at once!

He remembered a naked child, Joesai, saving him in his first Trial of Strength at the creche when he had been too young to really understand the danger. He had always been of small stature and unable to repay Joesai in kind, but many were the times he had anticipated Joesai's troubles and thus prevented them—Joesai whose flashes of energy were too quick for sound judgment. Everyone had always said that this brother of theirs courted death, that his rashness lacked kalothi. Hoemei had expected him to die and had long ago prepared his stomach for that event, but not, it seems, prepared it well.

While the man of Clei stood watch over the increasing shock of his respected priest, reluctant to leave until his maran seemed less shaken, a remembrance came to Hoemei of Teenae in the early morning of their wedding feast, he frozen by her door, his mind anxious for his child bride so vigorously taken by three young husbands who, affectionate as they might feel, had shown no real control over their lust.

Her head lay against the pillow where they had left her, her nose in sharp profile, like sculptor's wax, her body sprawled, one leg up, hand clutching his gift of lace nightdress above her hips so that her navel was shadowed. She was too young for a woman's hips. She lay still as death, her kalothi leached by pale Scowlmoon.

Then she breathed. He went closer to watch her, to hold his fingers below her nose to feel the truth of her breath. Her head turned and her eyes opened serenely. "Um," she said, remembering. "What was all that about? Am I really married now?" She pulled Hoemei to the pillows with her, curling around him. He left his hand cupped to her child's breast, feeling the breathing, happy.

I need her, he thought, unable to weep.

Dismissing the worried clerk, he paced about his office, the careful draft of his speculations about different governmental structures left in mid-sentence. Then he walked up through the ovoid levels of the Palace to the communications room and took command of the rayvoice and tried to reach Gaet who was in the hills supervising the construction of the new skrei-wheel road to Sorrow.

Later it seemed that he slogged for centuries through a berserkly giant kolgame in the city streets of Kaiel-hontokae, a wooden piece moved by some obscure strategy. Noe *knew* when she saw his face. He never told her; he just cried. She refused to believe that Joesai and Teenae were dead; she questioned him and held out hope, barring her own shock, but Hoemei was sure and he bawled.

Noe would not cry. She *did* have a beloved co-wife with whom she could share her men, and little Teenae was *not* dead and Noe would not cry for nothing as long as she could force all her emotion into comforting Hoemei. Yet when her man slept, the tears burst forth, silently, rolling down the cicatrice designs of her cheeks like a flood upon plowed ground.

26

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During the time of Arant glory it was the Arant who said that suffering leads to greatness of spirit. The Kaiel think otherwise. It is greatness that leads to suffering—for who can understand a great man? And does not the lonepriest live the agony of holding worlds which cannot be shared?

Tae ran-Kaiel at
the funeral of Rimi-rasi

The mountain inn was tucked into the branch of a gorge high among peaks that had taken an unseasonable snow cover. Like all inns of the Long Road, it was run by the Ivieth. Old porters, who could no longer bear the burdens of the road, brought wood for the fire and kept the soup hot and cared for travelers. Young children abounded, bigger and broader-shouldered than they should have been, unruly with each other, racing through the halls of the inn, but unreservedly polite with the inn's clientele.

Oelita sat in a corner alone but as close to the fire as she could get and still be inconspicuous. She was subdued. Ordinarily she would be sitting at a table with the Ivieth or would have intruded upon travelers to make new friends and joke away the tiredness of feet. But this was already Kaiel territory. The fear had grown as the rolling hills had given way to rocky slope and twisting trail and heights that awed her, while chilling winds played with her body like the bush she had seen caught and tossed into a ravine.

She had sent the crystal ahead by trusted messenger and it would be safe—but still she was afraid.

A white-haired woman, who was stooped but still far taller than Oelita, brought her a bowl of hot soup. Three other men entered the door and pulled it closed behind them against the tugging wind. One Oelita recognized as clan Mueth from the brilliant headdress of fibers woven into his hair. One was of a far clan she did not know. The third stood shorter but carried himself with such authority that she knew him to be of the formidable Kaiel.

"Gaet!" said a man at the far end of the room, raising his mug. The Kaiel returned the gesture but went to another table and was lost in animated talk. Three Ivieth children, obviously well known to him, rushed forward and began to climb all over his back to remove his outer garments. For a moment Oelita glanced up and saw the grandmother standing transfixed, smiling in the Kaiel's direction, waiting, as if she expected to be noticed shortly. He ignored her, making his rounds, a joke here, a backslap there, a fistclasp at another table, a hair ruffling for a child.

"Gaet!" said the old woman impatiently.

Finally, he turned to her, warmly. "You think I'm hungry, eh? You *know* I'm hungry. I could eat the bark off a tree! What's in the soup?"

"Gaet, you sit yourself with this young traveler who's braving the mountains without escort—it's the only table we have free—and I'll work up something to fill you."

He grinned at Oelita warmly. "I've come at breakneck pace since I heard a rumor that a certain heretic passes through the mountains unescorted." The man sat down. His open shirt

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showed the hontokae carved into his chest.

He knew her then! "Would a Kaiel escort give me safety?" she asked ironically.

"Ah, then you have met Joesai!" he exclaimed, slapping the table.

Her heart began to pound at the mention of this name. Here was a game she did not understand. "I want no Kaiel escort. I value my life."

"There are disparate factions among the Kaiel. Is that not the case among all priest clans? I represent the faction of the Prime Predictor who very much wishes you alive."

"Who is Joesai?"

The man called Gaet laughed at her intensity. "Joesai might perhaps be called a lonepriest. He has strong loves and his own ideas of the way things should be. He survives best when he is a long way from the reach of orders generated by men he disagrees with." He sobered. "We have reason to believe that his group was captured near Soebo."

"The Mnankrei have him?" Oelita was incredulous.

"We've had no word from him. Hoemei of Aesoe's staff bid me escort you safely into Kaiel-hontokae. Hoemei is purveyor of the relief program to the coast. We have sketchy information that a famine approaches. What say you?"

"The underjaw ravages the land. The Mnankrei burn our stores. We need help."

"It is fortunate that we have met."

"The price you will ask for your help is too high."

Gaet laughed a short burst and trailed off into silence. He began to turn his soupbowl with extended fingers, staring at it. She noticed that he only had nine digits. A little finger had been amputated. Over the soup, the aromatic vapors rose and dissipated like thoughts forming and unforming. "We Kaiel see the future with almost the clarity of dreams. A hard bargain struck while we have advantage leads always to strife in the future, always, always, always. We make bargains in hard times, yes, for that is our skill, to mute misfortune; but we do not consciously forge bargains that have no use when times are better."

"You will offer us food for rule—just like the Mnankrei," she said bitterly.

He shook his head. "We cannot even offer you food in the weight that can be shipped from the Mnankrei islands. The mountains and the distance are great obstacles, but we offer you sounder rule. It is not the Kaiel who blended human gene with underjaw body so that children will not have the wheat that has been nourished by the sweat of their parents."

"They did that? That, too?"

"Someone did."

"You found human genes in the underjaws Nonoep sent to Kaiel-hontokae?"

"Yes."

"That's criminal! That's horrible!"

"It is power gone awry as power will. When a priest needs power more than he needs to be a craftsman of human destiny, such things happen."

"How will you possibly get wheat through these mountains? I was not awed by them when they were only words to me and a hazy jag along the horizon—but here I am and I'm awed."

"Come." He kept her hand and led her outside into the wind that howled

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along the gorge. Her skirts flapped. He endured the cold, shivering. The world seemed dreadful and dark with Scowl-moon eclipsed by the mountain peaks.

"We'll freeze out here!"

Gaet brought her body closer to his own, maneuvering her around to the back where the wind clawed less, sheltered as the spot was by craggy wall of rock. They came to a filigree machine with three fine wheels partly buried in the drifting snow. "We're rebuilding the roads to take them. Wheat can move west in such vehicles, which can then return people eastward to famine camps in the foothills above Kaiel-hontokae."

She saw the swift Mnankrei ships and the good harbor at Sorrow, and at the same time she saw the Wailing Mountains and the treacherous trail through the Valley of Ten Thousand Graves. Was he aware of how absurd his challenge appeared—a frail vehicle against this frightful terrain? "Let's go back inside."

"You don't seem impressed."

"How could I be?"

"Neither am I," Gaet said, subdued by her coolness. "It's the best we can do."

She invited him to her tiny room and he built a fire for her, then rummaged about finding a quilt to warm her back. It was a lesson to her. All the Kaiel were different. This one was not violent like Joesai. He had an easy compassion. "I must ask you one more question."

Gaet nodded while feeding another bush trunk to the blaze.

"I have been challenged by the Kaiel to a Death Rite. I wish that ridiculous game to be cancelled. I wish protection from such nonsense."

"I have been sent to protect you."

Impulsively she began to search Gaet for knives. He only laughed and squatted by the fire, letting her touch him. "Is this Death Rite a personal obligation of Joesai, or is it a clan obligation?" she asked.

"Once he has initiated it, the Rite becomes a clan obligation."

"I'm going back to Sorrow."

"No need. There are many ways these things can go."

"Yes," she flared. "You could kill me tonight. I have no reason to trust you."

"How many of the Seven Trials have you survived?"

"He has said three. I count four. And I'm frightened."

"Aesoe seems to have been correct about your kalothi."

"I'm just a woman. I can die. Living is itself a Death Rite and no one survives!"

He pondered. "I'll tell you what we can do. It will fit each of the criteria. We won't return via the road. We'll knife through the mountains, over the White Wound. That will be Trial Five."

"You think so little of your own traditions that you mock them!" she snarled scornfully, backing away from him to the pillows, where she wrapped herself in a quilt.

Gaet reproached Oelita with a hurt look. "The White Wound is no mockery. That mountain often kills."

27

Every backflow of information through time destabilizes the future. If we had

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a torch to illuminate the darkness of tomorrow, as Getasun illuminates dark Scowlmoon, what we would see would not be what will happen. The mere act of observing the future alters it. Not even God can violate the first law of clairvoyance. Learn this law well, Kaiel child, use it, and you may become the Prime Predictor.

Foeti pno-Kaiel, creche
teacher of the maran-Kaiel

Smells of spice wafted through the great dining room that kept twenty Palace cooks busy. It was a room where Kaiel met and where Kaiel decided. They were a clan who enjoyed eating while they worked. Hoemei, in the doorway, was hailed by Aesoe from the heavy wooden table where only the most powerful dared sit.

He was with Kathein, and another.

To avoid them Hoemei's eyes shifted to the small Liethe woman. Those Liethe were as cold as a northern river dammed behind spills of ice until they smiled at you in a way that made you feel as if you had just met the love of your life. Her blue and flecked eyes were watching him boldly. Once he had disliked these women as ostentatious examples of Aesoe's power but he had lost his dislike the first time one of the Liethe—he could never tell them apart—had served him tea. He never tired of watching them dance, as they often did at Aesoe's parties. Some said they were intelligent, but graceful as they might be they were far too servile for Hoemei's taste. This one served both Aesoe and Kathein—and ate with them as if she were their equal.

Kathein and Aesoe.

He felt bitter. He would have avoided Aesoe now, but for Kathein. He went to the table. She pretended to be in animated conversation with the Prime Predictor and only when Hoemei arrived did she look up and nod. He nodded back. They said nothing.

"Kathein was telling me of an interesting communications trick. She wants to bounce long heat waves off the moon."

"Devious mirror magic," said Hoemei with frigid politeness.

"No, no," Kathein said stiffly. "It is just like the rayvoice only the waves are shorter, more difficult to generate."

The Liethe woman was glancing sidewise at Hoemei. It gave him a good excuse to ignore Kathein. The moment he smiled at this strange unmarked creature, she spoke. "The baked spei is what you're smelling. I'll bring you some." She waited.

"Honey, a jug of mead, too," said Aesoe.

Liethe fingertips touched Hoemei lightly, then withdrew. "He didn't ask if *you* wanted mead. They have juices today."

"Mead is fine."

Kathein was searching him anxiously. "Have you heard from Joesai and Teenae?" she asked formally.

"No reason to think they aren't dead." His bluntness was deliberately cruel.

Kathein shrunk into herself. "I told him to be careful."

"There was never any hope for Joesai," said Aesoe solemnly.

Hoemei could not answer. Tears were brimming in his eyes, more because he had been cruel to Kathein than for Joe-

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sai. Honey returned with the food, and he used her attention as an excuse to say nothing while Kathein chattered inanely about technical matters. All this time the Liethe woman never lifted her eyes from Hoemei and finally, when he had finished eating, she spoke to Aesoe. "He is leaden with grief, Aesoe prime-Kaiel. If it pleases you I will take care of him."

"No! Let me talk to him," said a stricken Kathein.

"You will stay here," said Aesoe.

Hoemei left them abruptly, but he was followed by the flowing Liethe. That annoyed him. "I didn't ask for your presence."

"But I asked for yours," the se-Tufi Who Walks in Humility said softly. "I've wanted to be alone with you for years," she lied. Then, with gentle authority, "To your room."

He was mystified that when he listened to the light tinkle of her voice, waves of grief touched him. He had to fight to keep phantom losses at bay. In his room she lit a single candle. Her presence recalled his childhood dream fantasies of women. Some such woman had leaned over him the Night of the Crooked Trial. She turned to him and he did not know the name of the year.

"It is not all right that they are dead, is it?" she asked, putting no qualifier on who was dead.

He saw creche mates dead, and funerals, and the dissection tables at the creche, and Sanan, his brave brother, dying in the desert when he was a boy. Hoemei wept. He talked about his family, first incoherently and then with calm passion, finally to laugh remembering what a poor sport Teenae was when she lost at kolgame. Somewhere in all this Humility moved away so that when he noticed her again, he found her sitting serenely on a cushion with her elbows on the floor, looking at him, listening solemnly.

"Tell me," he said with genuine liking for this creature, "why does a man get the impression when you make eye contact with him, that he has just met the love of his life?"

"Because he can't have me," she teased.

"Which of the three are you? I always get you mixed up. Aesoe claims he can tell the difference."

"I'm the frivolous one. I'm easy to arouse, curious. Aesoe doesn't think I'm intelligent, but I'm much smarter than he thinks I am. I just need someone like you to bring it out in me. Do you want to do something frivolous?"

"You're bringing out the shyness in me."

She slipped over so she could hold his leg. "I'm shy, too. Men don't know that about bold women. They think that just because we boldly go into a man's quarters where no woman has ever dared go before, that we aren't scared to death."

"I sincerely don't think you are frightened of anything."

"Oh yes I am. I'm scared of what you're going to do when I sing a lullabye in your ear." She moved her mouth next to his ear and whispered:

"If beetles chirp
And babies hear
Can the wind a-knocking go?
Walking feet
And tickled chin
A baby's smile will know."

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She kissed his ear. "I'm full of nonsense. You have funny ears. Did you know that Aesoe says you have a magic ear and can hear anything anywhere on the planet? Is that so? Is this a little magic ear I'm kissing?"

"Almost."

"Aesoe says it's a secret."

Hoemei laughed. "He thinks of strategic advantage. I think that the Kaiel will benefit once the secret is out and all can build a magic ear."

"Only the Kaiel can do that."

"No. It's easy. It takes pieces of wire and bits of glass all hooked up in a careful way that anyone can learn, no more."

"You don't really know what happened to Joesai and Teenae, do you? They might still be alive. I could find out if I could talk to Soebo. Aesoe won't let me so we'd have to do it in secret. Can you keep a secret?"

"You have contacts in Soebo?" Hoemei was suddenly keenly interested.

"Of course. There are Liethe hives everywhere. We know everything."

Hoemei smuggled her into the communications room and put in a call to his Soebo spy group. After he had made contact he put the round earvoices over Humility's head and she listened open-mouthed to the crackling speech. When she talked, the earvoice answered her! She instructed her voice friend in the details of a cryptic code with which he could contact the Liethe hive.

Humility was very curious about the electron demons that danced in the soft red glow of the sealed jars. She was appalled by the complexity of the strange machines and poked about in them until she received a shock that made her jerk away in surprise. "You said I could make one of those," she pouted. "It doesn't like me. It kicked me!"

28

One man alone is like a cripple bound to his pillow.

Two may live serenely, with occasional storms of high happiness, if the weather and the times are with them, and chance smiles on them, and Death does not halve them.

Three restlessly seek another mate like water seeks the sea, but a triumvirate is the freest of all marriages from conflict. A chair with three legs does not wobble.

Four is the threshold of emotional wisdom, a game for the players of the game of love who have won.

Five, like Three, is sensually unstable but transmutes more opulently in the harmonics of its shiftings. Thus the mates of a Five are adepts at conflict resolution.

Six is the marriage of completion. The children of the Sixes shall inherit the stars for the symbol of six is the star.

Version of the Marriage Troth
from the *Kaiel Book of Ritual*

The hill of mansions which held Gaet's home on one of its winding streets amazed Oelita.

It did not suit her image of herself to be so awed by splendor. He took her by an arm through the massive wooden door into the inner patio, so luxurious it could almost be a place of Ritual Suicide.

He cocked an ear. "I think we have

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this mausoleum to ourselves." Then he raised his voice. A great warble came out of his mouth like the one he had loosed upon the peak of the White Wound. He cocked his ear again. "Even the servants are out. Well, let me offer you Greetings."

"I'm most honored to be your guest." She bowed and smiled at him.

They heard footsteps. "Gaet! You brought her!"

"My one-wife Noe," he announced, "taking her time as usual."

Oelita bowed stiffly.

"So it is you who have caused us so much excitement."

"Isn't she a feast for an empty stomach?"

"One-husband is vulgar," answered Noe warmly.

"Hoemei must come home tonight if we can reach him."

Noe's eyes twinkled. "We may never see him again. He has been caught by one of Aesoe's Liethe."

"I'll have to go over to the palace and fetch him after our bath." Gaet was laughing. "Rescue him is more like it."

"Who are these Liethe?" asked Oelita. "I've seen them following our Stgal at five paces."

"For *our* men they dance naked," teased Noe, nudging Gaet.

"One of these days," said her husband darkly. "I'm going to sell you to the Liethe."

"No you won't! You love me too much. Besides they wouldn't buy me. Liethe bodies are undecorated."

"They might need you for leather and soup."

The ornate bath house was already steaming. Oelita marveled that bronze pipes brought the hot water to the raised stone tub. Gaet was smiling broadly. "I'm relaxed already," he said, dipping his finger into the water while Noe pulled off his boots. Oelita, trembling, began to disrobe.

Noe had shampoos ready, and perfumes, and delicate soaps made from rare beetle oils, and sponges of a scrubby texture. She took such familiarities with her husband's body that Oelita felt cut off, watching them. Noe was his wife, for sure, but she, Oelita, was his lover! She did not care what the rituals were! She took a sponge and began to wash Gaet herself. He was hers, too! Noe smiled in a way that seemed to say: don't we have a nice man? For the first time in her life Oelita smiled at a woman with the smile she used to seduce men, and felt confusion. *I wonder who he'll sleep with tonight, me or her?*

She had thought once of marrying a man. She had had many lovers, more than she could remember, but her relationships were all one to one, as if she had somehow never left her adolescence. *I'm too much of a loner.* For too long she had struggled in her outside world, even though the struggle had been rewarding. She was enjoying being shared.

"It took you all long enough to get here!" roared Hoemei, peering around the threshold. He picked up a scrub-sponge. "I can smell that these women are being too gentle with my filthy brother."

"We hiked over the White Wound."

"You what? You let him take you there?" Hoemei stared at Oelita in astonishment. "That's a killer mountain.

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Of our group, only Joesai has ever dared go back."

"Do you know Joesai?" Oelita asked warily.

"Same creche," Hoemei laughed. "He's been giving you trouble?"

"Yes!"

"I just got a report on him today. From Soebo."

Noe froze. "He's dead?"

"He's not in Soebo."

"And Teenae?" Noe was anxious.

"Not a word."

"He's your friend!" said Oelita accusingly.

"Sometimes," said Noe, wryly.

"Sometimes," said Hoemei, laughing.

"Hardly ever," said Gaet with a straight face.

Amidst green bottles of oil and boxes of perfume sticks and piles of stitching for a quilt, Noe did Oelita's hair and dressed her. "How can I wear this?" exclaimed Oelita. She adored the ruffles, but the gown was split up the sides, all the way.

"I've worn it in the street," said Noe.

"You didn't!"

"At night," Noe admitted, grinning.

"If I'm going to wear this, you have to wear something provocative, too."

"No. I'm too lazy to change. And it's too late."

Oelita hesitated. "Noe, tell me. Am I in danger here?"

"For your life? No. For your soul? Yes."

"If I ever offend you, tell me first before you act, please."

"I'm known to be blunt."

"Am I intruding on you? I mean with Gaet?"

"Little barbarian, we're looking for a new woman. We had one but these things sometimes are poured into a cracked cup."

They spent the evening in Hoemei's room, playing a wild game of kol that had the men screeching and Noe laughing at Oelita's unorthodox style. No one could understand why she was beating them. Gaet sat beside her on the pillows, affectionately caressing her from time to time through the convenient slits.

So, she's going to give him to me tonight. Oelita wanted him. He was the only security she had against a rising panic. She had to have him, so knowing she was going to get him relaxed her, and her erotic warmth began to grow. But Noe took Gaet with her and they said goodnight at the door, leaving Oelita on Hoemei's bed.

She trembled. She did not want to be alone and she did not want to stay with a stranger. She tried to read the soul of Gaet's co-husband, searching his face.

"You're welcome to stay," he said.

"For a little while. You have a cozy room."

"It's strange to meet you," he said.

"I'm all disarrayed," she replied. Hoemei was handsome in the candlelight. Was he being shy now? He had been so bold earlier. If she just pretended she was part of a Four, what could go wrong? She was extraordinarily curious about marriage. In any event, she needed to bond Hoemei to her, if it was true that he was in charge of coastal relief.

She could love a man who created no pressure. "I'll stay." She watched him put things away neatly, a compulsive man. "Hoemei? Do you love Noe?"

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"Of course."

"Do you love your Liethe creature?"

"Now that you mention it."

"Do you like me a little?"

"I was smitten at first sight."

They were lying beside each other, not touching. It was curious. The flame made great leaps and flickers and died. The silence upset her in this city far from the comfort of any friend. She needed contact and she was afraid of his touch. "Hoemei, what is your price for helping us on the coast?" Words, even intellectual words of great moment, were touches—in a way.

"Do you know our form of government?"

"The Kaiel are the hereditary leaders. The usual. I don't approve. I think other clans should have political duties, too."

"It is not as simple among us. When we go to the coast we won't be distributing food through the Stgal. We'll send in priests. Whoever so wishes pledges to an individual priest and the priest then contracts to help him."

"The Stgal will object."

"The Stgal will have no say, having been bypassed. Suppose I sign up your people and supply them with food. Then they are no longer in the kalothi chain of the Stgal temples; they are in the kalothi chain of my temple."

"And the price?"

"It is an exchange. We are problem solvers. What is the solution of your problems worth to you?"

"I'll give you harder problems to solve!"

"Women are good at that." He brought his face close to hers in the dark until they could feel each other's breath. "Like what?"

"Cannibalism!" She bit his nose gently, just so he didn't get too close.

"Ouch. That's not a problem."

"It is!"

"Meat is the *solution* to a problem and you don't like the solution. It is said you are anti-tradition."

"I *hate* ritual!"

"Tradition is a set of solutions for which we have forgotten the problems. Throw away the solution and you get the problem back. Sometimes the problem has mutated. Often it is still there as strong as it ever was. We do better when ritual is in control."

"We're just talking because we are afraid of each other. Why don't we just shut up and you can hug me and I'll hug you." She slipped her hand over his back.

"Where did you learn to win arguments?" he asked.

"No last words!" And she was hugging him. "Only I'm allowed last words! What does a wife whisper in a husband's ear?"

"Usually she tells him to shut up!"

After their lovemaking Oelita stared at his dark image, wide-eyed, smiling, with her head in her hands and her elbows embedded in the pillows. She decided that she liked to play at being married. She had two men now who loved each other and were bonded to her. Two men in a strange and hostile city were always better than one. Under the quilt next to her body, the hot warmth of him was safety.

She dreamed that her body was illustrated with shifting tattoos and that great scholars came to study her both by sunlight and by candlelight and went away shaking their heads in wonderment. The

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dreams went on, mutating. Her body began to tell lighter stories, frivolous ones even, stories of casual love and humor. She snuggled up to her man. He was patting her buttocks affectionately, and she reached around to stop him, half awake now, and the hands were not Hoemei's hands. They were big and hairy. She was screaming before she was half awake, trying to drag herself against the wall away from the huge monster.

"Where did you get such a beautiful bum?" said the monster.

"Oelita!" said a tiny Teenae in the doorway, round-eyed.

Oelita didn't stop screaming. Hoemei had her in his arms by now, comforting her. "It's only Joesai." He was stunned. Teenae was hugging Hoemei and squeezing him. "It's me! Remember me! I came back! And I love you and am I glad to see you!" The screams brought Gaet and Noe flying out of their bed to collide with Teenae, who heard them coming. Teenae clamped her arms on Gaet's neck while her feet crawled up around his hips to grab him viselike in their embrace. "My beloved lost lover!" she crooned. "Aw, Teenae!" he said happily.

Hoemei was bawling in relief. Joesai and Noe just stood grinning in the middle of the chaos. Oelita, backed against the wall in shock, holding the quilt to her breast, tried to understand the revelation that these people comprised a single family. In avoiding Joesai her terror had taken her straight to his co-husbands and wives and here she was thrown into the room with him and there was no more safety.

* * *

29

If Death is in front of you, he appears to be behind. A man who runs from Death runs into the arms of Death. A man who faces Death turns his back on Death and, standing there, proud of his courage, is taken from the rear.

The nas-Veda Who Sits on Bees,
Judge of Judges

Humility was wrapped in the robes of the Miethi desert clan that bordered along the edge of the Swollen Tongue. Her face was veiled and her fingers clothed to the second joint. She poked in shops, wandering, sucking on flavored mountain ice.

Nothing was as refreshing to Humility as these brief moments of freedom both from the men she obeyed and from hive discipline.

At the shop of a coppersmith she picked up some pieces she had ordered and, farther on, a thumb-sized jar of chemicals. Subvocally she hummed the piped tune of a dance and her ghost feet jigged while her real feet plodded an idle path down the street of Early Wings.

As she had been instructed, the jeweler-merchant was there, cooped in his narrow room that was hardly wider than his heavy door. Yes, the pale man was of the Weiseni, a merchant clan spread over half of Geta though rare in Kaielhontokae. He had the rectangular carvings in his skin and the nose ring. She was his only customer.

She asked him shyly for beads, some rich green ones, and smiled at the man with her eyes, then readjusted her veil so he could see less of her. While he

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was stooping for the beads, she yanked a wire loop around his neck so quickly that he died without even surprise on his face.

Why did the old crone want this particular Weiseni dead? She did not know. The old crones were too old for men so they played politics on a grand scale. A leisurely moment later Humility had closed and barred the door and drawn the shutters as if her victim were gone on some errand as jewelers were wont to do.

Dusk was a pleasant time of day. She disposed of the jewelry she had stolen, to mask murder as robbery, in the wishing pool at the Bok of the Fountain of Two Women. Dead insects floated on the surface of the water. A hawker was selling hot spiced soybean curd to passers-by for copper coin. She bought one with bread and sauce, eating it while she watched the crowds.

Too soon, Humility's time to herself was over. She wandered back to the hive, gradually changing the appearance of her robe so that she would no longer be mistaken for a Miethi. Once there she retreated to her cell, then took the copper pieces, the last pieces, and finished assembling the toy rayvoice that Hoemei had shown her how to build. She had seemed stupid but only because she was checking three ways everything that Hoemei said.

None of the Liethe knew what she was doing; even Honor, who had taken over the Honey persona for the week, had not been able to duplicate Humility's rayvoice experiences, and would need special training if she were to continue Honey's escapade as Hoemei's mistress. The only rayvoice part Humility had been unable to make herself was the electron jar, which at great expense had to be procured from the craft factories. Magic always had its loose ends which made it hard to steal.

The universe, according to Hoemei, was like a tuning fork. If you sang the right note at a tuning fork it vibrated. The whole world was many such tuning forks, conjoined, and if you calculated the linkages and built real ones to match the calculations, then you could have a musical instrument that would respond to your voice a hundred days' journey away. Humility didn't really expect her box to work even though she had been very careful with the calculations, checking them by hand as well as by o'Tghalie, but she hoped it would.

Cocked Ear burst into her cell, astonished. "What is it? I heard Aesoe speaking! Was that really him?"

"Silly. That was me! You heard me?"

"I should have known," Cocked Ear giggled. "Aesoe is never that obscene!"

"I want to try it on the crone mother! Set her up for the game. As soon as she has the voice to her ear, wave a flag in the corridor."

When the signal came, Humility said into her box, "Your enemy sleeps!"

The crone mother was at her door almost immediately, huffing and trembling. "What is this thing!" She held out the talking shell as one might the giant mutated head of a fei flower.

"It's a magic ear!"

"Did you steal it from the Palace?" the old crone asked almost in panic.

"I made it! Hoemei showed me how."

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Humility was received with disbelief. The ancient woman could not imagine herself learning how to build such a device. The se-Tufi had an illustrious place in the chronicles as one of the more intelligent clone-lines but they were not magicians!

Humility smiled with engaging innocence. "You never had Hoemei for a lover!"

But the old mind had recovered and was already testing possibilities. "How far can it reach?"

"Not far. This one is only a toy."

"You've seen the fuller magic?"

"The magician's workshop in the Palace, yes."

"How far does this magic reach?"

"You've heard the gossip. Anywhere on Geta. Sometimes noise demons cast counter magic." Humility's eyes lit up proudly. "I've *talked* to our Liethe sisters in Soebo."

The crone's cane rose and jabbed the air. "When!"

"A mere few sunsets ago."

"You chatted about the size of Mnankrei dongs?" the crone asked sarcastically.

Humility bowed. "No, honored one. I have brought a special message for you. I knew you wished this information so I asked if it were obtainable. It is Winterstorm Master Nie t'Fosal who does genetic probings upon the lowly underjaw."

"Ah, so it is true. Aesoe has made such speculations." The hive mother dismissed Cocked Ear. She waited until they were well alone. "How went your afternoon?"

"Flawlessly."

"And the jeweler? Did he suffer pains?" Hag eyes glowed like bone heaps in the cremation fire of a poisoned man.

"I do not dally to allow my opponent the choice of a response. He never knew."

"Yes. I suppose," she grumbled. "Perhaps it is better that way." The harridan did not sound convinced.

30

When a dobu of the kembri attacks a man, he uses the forces inherent in his opponent's defense to exact defeat. If a push is expected, the dobu pulls. If a pull is expected, the dobu pushes. In like manner a man's mind is attacked. Do not use reason against an enemy. Strike him down with his own logic.

Dobu of the kembri,
Arimasie ban-Itraiel in "Combat"

In the year of the Moth, the week of the Horse began with a celebration dedicated to that mythical sidestepping insect, the Horse piece of chess who was commonly known as the Protector of Infants. Naked children wearing elaborate Horseheads had been prancing about the streets the moment Getasun was fully risen, begging favors from every passing adult. It was quite evident that none agreed either on the color or shape a Horsehead should take.

"Watch out!" said Teenae, cautioning Oelita. "There are more hiding in ambush in that alley." A purple snout with bulbous hoiela eyes sprang upon them, holding the hand of a smaller grinning beast. They cajoled two glass marbles from the adult women who car-

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ried shoulder bags of goodies on this morning.

Teenae had attached herself to Oelita, feeling a fierce loyalty to this woman who had saved her nose, perhaps her life. They were bonded by that encounter and by the code which made the lover of more than one husband her personal charge. Nor could she forget her already once-failed vow to protect Oelita from Joesai.

"Do you know this Kathein pnota-Kaiel?" asked Oelita.

"Very well." Teenae was apprehensive about the meeting she had set up.

"I'm not sure I understand why she would be interested in my crystal. Is she a mystic?"

"Your crystal is a Frozen Voice of God."

"That's why I thought she must be a mystic. She looks at it and hears things?"

"It would be hard to explain to someone who has lived her life under Stgal rule just what Kathein does. She is a dobu of matter. If we wish a wagon to come to market with us, we must swear and push and sweat. Kathein uses the lifeless forces against themselves to work her will. When she commands a wagon, it follows her. When she holds a crystal it remembers God."

Oelita shook her head at such quaint hill madness.

They were stopped by a hideous-headed child in front of the old stone building by the Moietra aqueduct that was Kathein's retreat. The delay cost them a pea shooter. Oelita laughed, and lifted her skirts to avoid a patch of mud that leaked through the cobblestones. "So this is the abode of the magician to whom wagons heel and stones talk? The sight of such a dark mansion so close at hand instills precaution. How will I greet her?"

"As one who has done her a Great Favor."

"I will not reveal the location of my crystal until a deal is complete and widely known."

Teenae felt a stab of pity at such naivety. Then a young bonded Kaiel from the creches greeted them and brought them to Kathein's presence in a tapestry-covered room of high ceiling. She wore trousers and a bodice that held her breasts but exposed them as was the tradition with a nursing woman.

"Kathein."

"My Teenae." The voice was warm, unlike the face. "How happy I am that you are back with us. I had my fears."

"We've heard little from *you*."

"Your wounds have healed?"

"You can't divide an o'Tghalie by zero," said Teenae, trying for levity and finding none.

"Oelita," said Kathein, taking up her duties as hostess, "my house is yours. I am astonished at your possession of the crystal and grateful that you have brought it here to me."

"I have not brought it as a gift."

"You are refreshingly blunt." The first wispy smile crossed Kathein's face. "Soepei," she spoke loudly to another room, "bring the box." She returned her eyes to Oelita. "Teenae has told you of our fairness in dealings. I repeat that this is so." She settled her guests on pillows and offered them hot spiced tea which had been warming on a low table. The box was brought to her and she

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opened it to reveal a rectangular crystal on velvet.

"Teenae has told me that you have a Frozen Voice of God, too." Oelita used the name with only a hint of sarcasm. "Yours has the same pale blueness as mine."

"This Frozen Voice of God is the one that was formerly in your possession. You'll recognize the chipped end."

Teenae swiveled her eyes to Oelita, examining her friend minutely for shock. She poised, ready to restrain her, but Soepei was there, alert, strong; and Kathein sat, ready.

Oelita kept her game face. "And my man?"

"Detained at the Temple of Human Destiny. He will receive a bounty from the Temple as reward for his fine care of the crystal."

"You are gracious." Oelita's voice revealed by its hollowness just how stunned she was. "How did you find him?"

Kathein paused. "Oelita, you do not understand this city. It is *our* city. Almost every human here has a personal contract with his own Kaiel and little goes on that is unreported to us."

"I am at your mercy."

"No, you are not at our mercy! We are profoundly grateful! We shall be negotiating with you as if you had retained possession of the crystal that God willed to you. That is the Kaiel way. When we cross hands on a deal it will not rankle with you in the future. You will not wake up some morning, knowing the true value of your crystal, and feel that you have been cheated."

Teenae spoke. "She is upset because of the Death Rite."

"*She* is upset! You should see Aesoe's stormings! Joesai is to be banished!"

"No!" said Teenae, stricken.

Kathein turned to Oelita wearily. "You have powerful friends here in the city. I do not know if Aesoe is angry at Joesai for his handling of you, or if it reaches his heart that my son is Joesai's son, but certainly the visitation of a Death Rite upon you is the excuse for his fury."

"Where will Joesai be sent?" asked Teenae in commotion.

Kathein was laughing without humor. "I could roast him in burning dung and feed him to the orthoptera! I tried to intercede for him but it did no good. Aesoe is shaking up a Gathering against the Mnankrei and will send him to Soebo. Aesoe does not waste the talents of a man he intends to kill."

"Does Aesoe wish Joesai dead?" asked Oelita.

"Yes!" Kathein answered her coastal rival.

"He has no mercy," replied Oelita thoughtfully.

"Of course he has no mercy! He'd send his own clone up for Ritual Suicide!"

"Joesai will object," said Oelita.

"He won't object to going to Soebo," mused Teenae. "That's where his men are."

"The Gathering will kill many." Kathein was morose.

"I, for one, will bet on Joesai's kalothi," Oelita stated calmly.

"He's foolishly impetuous!" stormed Teenae.

"He's stubborn beyond reason!" reviled Kathein.

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"Nevertheless, he has rare kalothi," insisted Oelita.

Kathein closed her hand on Oelita's wrist. "Aesoe is angry with Hoemei, too, but he needs Hoemei and cannot exile him. You will negotiate your deal with Hoemei. I will be custodian of the crystal. We have done preliminary work with it but our listeners are improper in their attitude and must be rebuilt"—she sighed—"again. I'll show you our one conversation with God." She gestured. "Soepei, bring the silvergraph."

The page was blurred, meaningless. "It is not more genetic maps. It is writing. Teenae, it is God's writing. Three pages are superimposed and we cannot read through it, but see the alphabet? It is not our alphabet but it is close enough. It is like the carvings in the wall at Grief."

"There's the under edge of a line of writing at the bottom!" exclaimed Teenae in awe.

"We've puzzled it out. This is what it says." She wrote for them:

somber helicopter gungod flew beyond the range of

"What does that mean?"

"God knows. God's Silence comes in mysterious hushes. We need more silvergraphs. We must have better rituals. We need more reverence and better tools. We need more coin."

"You are deducing much from very little," ventured Oelita.

"What? Did maelot excrete that crystal?" Kathein was impatient with barbarian speculations.

Oelita wandered to the window in puzzled thought.

"You do not visit us," said Teenae to Kathein, reproachfully.

"It is forbidden."

"Not everything can be seen by Aesoe."

"When you love people you cannot have, that is painful. When you see them, you inflict your pain on them though all you might ever wish for is to make them happy. Because of your pain they learn to hate you. I do not wish that to happen."

Teenae brought out a bright ribbon with a bauble on the end. She pressed it into Kathein's hand to remind her that her child was Joesai's. "For Jokain. Homage to the Horse," she said.

31

There is no way for the backward-facing mind to see what is spread before the forward-facing eyes. The mind and the eye are connected only by a chasm of time that falls from the here and now down to the darkness of our conception.

From "The Prime Compendium"

The Temple of Human Destiny was dominated by a circular window of blazing glasses that illustrated the backward-facing mind and the forward-facing eyes. It glowed like a lunar overlord in the dimness above the gaming dens where citizens played their wits against the priestly measures. Oelita thought the Kaiel temples obscene, profligate, grandiose compared with Stgal elegance. Noe, who had brought her here, showed a delight in overwhelming bigness that probably stemmed from an architect daughter's pride in the sheer ability to over-engineer. Still, the Temple was staggering.

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It was dizzying for a coastal villager to adjust to an exuberant people who were consciously building a city that they intended to be the dominant intellectual and ruling center of Geta. She found their religious pragmatism refreshing—but shocking to coastal ears—and it frightened her that she, who had always taken such a delight in shocking people, sounded conservative to herself when her conversation was interlaced with these people's easygoing disrespect for the temples they were totally committed to uphold.

Oelita was curious to visit the meat market. No such place existed in Sorrow. There the only meat was given away at the temples when it was freshly available, or one waited to be invited to a funeral. Here it was sold by the temples at atrocious prices. Noe bought a small jar containing two pickled baby tongues. For a moment, remembering her own twins, Oelita hated Noe with a violent passion. Then she calmed herself. She had long ago learned that the way to tackle such widespread customs was to accept them utterly until she knew the very source of the thought patterns that created the custom. Only then did she have a chance of exorcising it.

God's Will. That's what they would say. In the end she would have to destroy their God. He was at the root of all this evil. They thought: I am not killing and eating these children; God is eating them and I am merely the arms and mouth He lacks. She shuddered.

Oelita asked to see the back room where the meat was prepared. She spoke to the butchers gently, never showing her mind, searching theirs. They were jovial about their task as they prepared the carcass of a "machine"—the name the Kaiel seemed to have given the genetic monster-women who bore the babies for the creches.

"Ye covet a block o' that thigh? Cost ye an arm and a leg, it will." He laughed.

"Was she very old?"

"This un, ye'll have t' boil. She's mebbe 30-40 chile down the road."

These Kaiel "machines" matured sexually when a normal child was just learning to walk and hosted their first embryo immediately. Their second batch was always twins, and their third, when they were fully grown, triplets. Once they were as old as a normal woman would be at the first flowering weight of full breasts, the "machines" were worn out and ready for butchering. They were sterile, and reproduced by cloning.

Oelita left hurriedly and returned to the Temple where Noe was now engaged in a game of batra with an old gentleman, testing the quickness of her sight. As the red twilight faded, dim alcohol torches were lit, and Noe and friends decided it was time to wander toward the Chanting. They led Oelita through central Kaiel-hontokae, past stalls where anything might be had. There were artists who showed their work and willingly carved into your flesh the design of your choice. A cabinet worker planed and polished while selling, potter joked with rugmaker, and og'Sieth waited to make you ornament or instrument out of metal. Oelita broke away to watch a craftsman building electron jars by ghoulish electron light. Noe and her laughing male friend had to pull her away.

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Before the Chanting began they seated themselves in the amphitheater beneath the stars on benches carved from bedrock. The crowd joked. Men flirted with women they had never met before, and women teased men. Children were hushed. Newcomers arrived to display their finery.

A party entered from below, taking honored seats. Instruments piped a welcome. "Aesoe's group," whispered Noe, pointing him out to Oelita. "Your patron. You could have no stronger ally! I have been commanded to introduce you to him tonight."

Oelita craned her neck. He did not seem imposing at this distance. "Who are those women he is with?"

"Which ones?"

"They wear veils."

"Those are only his Liethe whores."

The music began like a faint whistling storm, and built on high piping reed instruments. The crowd hushed. Slowly eight male and eight female Kaiel, carrying torches and humming as does the wind blowing over the plains, ascended from two narrow underground tunnels. The procession moved by step and pause, step and pause. They were dressed only in cape and headplumes but the body designs that crawled in the flickering fire fully clothed them. All threw their torches simultaneously into the central pit, causing an explosion of igniting flames. As if by signal, eighty children flowed onto the stage, their bodies covered to hide their undecorated nakedness. Each wore a mask-piece which contained resonant chambers and flaring beaks to distort and amplify the voice.

Inexorably the Commandment Chant began its recitation of the laws of genetics—but in an astonishingly different form than anything Oelita had ever heard in theater. Throats swooped and boomed and danced in alien harmony, sometimes to soft effect, sometimes building on a rising timbre that shook the amphitheater with inhuman tone.

"What in the Sky?" asked Oelita so dumbfounded she willingly exposed her ignorance.

"Saeb has put God's Voice into the children."

"But how does he do that!"

"Don't ask about it! Just listen!"

The celebrating went on all through the brief night. Noe moved her party to a temple that was nothing compared to the Temple of Human Destiny and only a third as large as the Stgal Temple at Sorrow. But it was intimate and quiet in its glory. Noe told Oelita that this was where Aesoe had commanded them to meet him.

He was already there. He waved his people away to allow Oelita access to his table and immediately set her up for a game of chess. Being senior to her he took God's side, white, and opened with a classic Farmer to Child's four. He smiled and waited. She moved. He followed her move instantly.

Noe settled down on cushions beside Oelita. One of the Liethe appeared silently with juice for Oelita and disappeared. Aesoe's party watched. Of them all, Oelita knew only Kathein.

Every move was received with attention. There were horrified comments when Oelita let her Child run free without protection of Black Queen or Horse. She ate both of Aesoe's Priests and blocked him with a reach of her Smith.

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He counterplayed deftly. She had to hide her Child. It was the White God against the Black Queen. She was expecting to lose. Was this not the Prime Predictor who had the reputation for being able to see a hundred moves into the future? But she trapped him.

"Check," she said, speaking her first word to Aesoe.

Aesoe laughed. It was checkmate. He waited for her to eat the White Child as was the custom—but she would not. That was her custom.

"Come," he said. "I would speak to you."

It was near dawn, and he insisted on taking her up to the Room of Ritual Suicide to watch the vast red circle of rising Getasun transform the ovoids of the Kaiel Palace into molten iron. Oelita waited. It was not right for her to speak first, but she was content to observe.

"You will be dealing with Hoemei. That is my wish. Drive a hard bargain with him. Drive a ruthless bargain and I will back you."

"I want Scowlmoon, polished to a bronze sheen, for my morning mirror."

Aesoe laughed. "You will not get it."

"You only have a city with marvels of architecture, wealth, and land to give?"

"And very little of that is mine. I can't change the religion of my people, for instance."

"What if your wealth is not great enough to buy me?"

"Then you must ask the Mnankrei for their wealth."

So much for that. She changed the subject. "It seems to me that you sent for me."

"No. You came."

"But you've been interested before I came."

"And chose the wrong vessel to contact you! May Joesai die with no one to honor his flesh!"

"The first thing I will ask of you is that Joesai not be harmed."

"So it is true what they say about you, that you collect the wretches of the world!" He laughed. "I give you Joesai, in pieces or whole. That I can do. Joesai is not the moon. What next?"

"You could start by telling me what it is that I am to negotiate with Hoemei?"

"Why, the terms of the surrender of Sorrow."

"That is not mine to give!" This man was mad!

"Tell me then, to whom should I speak?"

"The Stgal are the priests of Sorrow."

"Ah, the Stgal. I have made a study of whom they represent. They represent themselves. And who represents the people of Sorrow? There is only you, and while it is true that you are not a priest, little details like that have never bothered me overmuch. I'll make an honorary priest of you. Marry into one of my families and I'll make a genuine priest of you! You are Kaiel in your soul and don't know it." He smiled gently.

"What makes me Kaiel?"

"You doubt my word?"

"Yes!"

"Ho! So it is true I can see some of what you fail to see? After our chess game I was despairing for my vision!"

"You taunt me! Which of my ways are Kaiel-like?"

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"Perhaps your need for flattery?" he teased.

"I would know how I am Kaiel-like so that I might cleanse my soul," she retorted instantly.

"Then you must abandon the self-aspect that makes you a political force," he chuckled. "The very first thing about a Kaiel is that he is not a hereditary ruler, he is a *hereditary representative*. Who knows how this came about? It did. Tae ran-Kaiel understood it and formalized our custom so that now we all understand why the Kaiel have had victory where all others have failed."

"And while you talk to me of surrender and treaty and contract," Oelita chided, "the Mnankrei take the coast by force."

"As God is witness, I have plans for the Mnankrei."

TO BE CONTINUED

IN TIMES TO COME

Arthur C. Clarke, who hardly needs introduction to readers of science fiction, has a unique background which makes him especially well suited to write on the subject of our next issue's fact article: "New Communications Technologies and the Developing World." His far-seeing familiarity with communications technologies goes way back—he is, after all, the man who "lost a billion dollars by inventing Telstar" before its time. And he has lived in a developing nation—Sri Lanka—for quite a few years. So I can think of few people better qualified to comment on the changes we can expect such things as satellite communications and microcomputers to bring to the Third World—and thus, ultimately, to the whole planet.

As we've both learned from past experience, it's hard to say with certainty exactly what else will be in the issue—that depends on how the pieces fit when it's time to put them together, and that can change. But I'm sure I can promise you Part III of Donald Kingsbury's *Courtship Rite*, and I *think* we can count on novelettes by Edward A. Byers and Timothy Zahn. Plus divers and sundry short stories and features—maybe even including "Pixie Dixon and the Mystery of the Haunted Playpen," by Ray Brown.

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the reference library

By Tom Easton

Listen, Listen, K. Wilhelm, Houghton Mifflin, $?, 301 pp.
Margaret and I, K. Wilhelm, Timescape, $2.50, 214 pp.
The Purgatory Zone, A. Darnay, Ace, $2.50, 240 pp.
Last Communion, N. Yermakov, Signet, $2.25, 184 pp.
Octagon, F. Saberhagen, Ace, $2.75, 272 pp.
The Wolves of Memory, G.A. Effinger, Putnam's, $14.95, 228 pp.
The Affirmation, C. Priest, Scribner's, $10.95, 213 pp.
The Gypsy Earth, G. W. Harper, Doubleday, $9.95, ?pp.
Alien Encounters, M. Rose, Harvard University Press, $12.95, 216 pp.
Paranormal Borderlands of Science, K. Frazier, ed., Prometheus Books, $12.95, 490 pp.
The Ghosts of Forever, R. Bradbury and A. Sessa, Rizzoli International Publications, Inc., $60.00, 130 pp.

I presume that you are like me in at least one way. You face the books of some writers with a certain reluctance, even when you know full well that you will enjoy them once you get into them. John D. MacDonald is one such writer for me—he deals with such depressing material so effectively that even though I love his work, I often shove it to the bottom of the pile.

Kate Wilhelm is another. Why? It isn't that her material is depressing, at least not always. It certainly isn't that she is hard to follow, for she is possessed of a remarkable lucidity and sanity. But she does demand attention and, as lazy as I am, I will often read less demanding books first.

Wouldn't that be a shameful admission from anyone who pretended to be a critic? If it is less so from a "reviewer," it is only because the reviewer is supposed to reflect the readers' tastes and inclinations, and my mail lets me

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think many of you do agree with me. That is, you are lazy too—so, get off your duffs and read some Wilhelm. She's worth our attention.

I have two examples here. One is a collection, **Listen, Listen,** containing four novellas, two of them new, and Wilhelm's Noreascon II Guest-of-Honor speech, in which she defines her brand of SF as "reality fiction." The best piece in the book and one well worth a Nebula or a Hugo, or both, is "The Winter Beach," in which a woman loses her job as a history professor when she asks for a leave of absence to research and write a book on eagles. Behind the loss is a man from the CIA, or so he seems, who pressures her to obtain some incriminating evidence from a suspected killer living near her Northwest Coast hideaway. Yet the killer is really being pursued because he may possess a scientific secret, and the heroine finds herself drawn to him.

Wilhelm's writing here is deft and satisfying, the senses of locale and relationship powerful. You share scenes and events as if you were truly there, and you end the story with regret that it does not go on. It could go on, too, as at least one novel. But if it did, its impact would surely be diluted. Wilhelm made the right decision, for all our wish for more, in ending it when she did.

You might think you would get more in the book's other stories. You do. But none of them are to me as vivid or as potent as "The Winter Beach." "Julian" is a nifty tale of how a religion might be tailored to an available miracle. "With Thimbles, With Forks and Hope" is a depressing story of death and an alien voyeur. "Moongate" is a man-woman love story set in the maw of an alien device that samples all of time, vivid enough, and strange, but no match for "Beach." Put it in second place.

Margaret and I is a novel, reprinted from the 1971 Little, Brown edition. It shows a Wilhelm as willing as now to tackle ambitious projects, but perhaps a shade less capable. The story concerns a woman at odds with her life, with her would-be politician husband and with the routine of her existence. In a borrowed seaside cottage, she finds notes left by a dead man who had been studying the nature of time and consciousness. She finds visions, too, and she learns much from the dead.

Yet this is only one aspect of the book. Far more interesting is the way Wilhelm chose to tell it. Her protagonist is not Margaret, but her subconscious, and the tale is told from that viewpoint. The effort is not entirely successful, for it takes an introductory quote from Jung to make the viewpoint clear. The lack of success is in part due to a problem of consistency, for it sometimes seems that Margaret's subconscious has a subconscious of its own, or that there is another layer of mind inaccessible to both Margaret and her inner eye. The purity of vision needed to carry off Wilhelm's gimmick is thus flawed. The book remains quite readable, however, and I do recommend it. It is certainly a worthy example of that other kind of SF whose shortage I decried last month.

The main flaw of Arsen Darnay's **The Purgatory Zone** is its use of mental powers. People have matured in his future, you see, and with maturity has come an openness to the universe that shows in ESP and in an ability to perceive directly "Teilhardian phantasmas," the elements of the noosphere, the psychic atmosphere created around Earth by the existence of intelligence. For individuals, maturity comes in ad-

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olescence with the aid of drugs and a "Maturity Trip" during which they see the tiny Earth from orbit. Thereafter, people abjure power trips and the like and dedicate themselves to cooperation.

That's fine. But even without the psychic trimmings, Darnay's world (called the Kibbutz Zone) remains a utopia, and he would need only a tad more in the way of technology to justify the story. His powers and phantasmas are only window-dressing, and since there is little (no) solid evidence of their reality in our world, they irritate. I am far more willing to suspend my disbelief in such things when they are essential to a story, as in Darnay's previous *Karma Affair*.

But enough of flaw. What's good about the book? A lot. All utopias have their misfits. Here they are retrogrades, who never mature in adolescence. They yearn for the bad old days, when such things as individual power were possible, when people could make a killing on the market or the battlefield. When their yearning becomes too strong, they go to the Time Van, which purports to shunt them into a parallel time-line more to their liking. The most popular parallel line is the Purgatory Zone of the title, and I will hint at the ending only by reminding you of the classic function of purgatory.

The story centers on Ravi Shannon, a retrograde. Fed up with utopia, he leaves for the Zone, where he immediately gets involved with murder, drug-running, and false charges of rape. Tried and condemned, he is impressed into the army, recognized as a missing heir, and handed the power for which he once yearned. Yet he has learned, and the excitement of power and violence no longer appeals. He has learned, in large part from people who seem to be doubles of his friends and colleagues back home in utopia. He has been rehabilitated.

The book is quite readable, but I don't believe it for a minute. Darnay is insanely optimistic to think that power-hunger and thrill-hunger can be educated out of people so easily and that a utopia can truly be built on sweet reason and cooperation. In this he has plenty of predecessors, of course. Some of them have even tried to put their schemes into practice, as indeed was done in the case of the kibbutzim on which Darnay models his world. Yet even the kibbutzim have their problems, and if it were not for the constant danger of outside attack—if their denizens didn't have plenty of thrills, in other words—they would have more. I suspect that utopias, like golden ages of childhood, SF, or Greece, are possible only in hindsight or imagination.

Nick Yermakov's **Last Communion** also has a psychic element, but it seems more essential to his story than to *Zone*. His characters are a survey team exploring a new world. Their puzzle is a species of tool-making natives that does not talk and that seems to ignore their presence. Are they intelligent? Must this world be barred to colonization? The answer emerges after Wendy Chan goes catatonic. The two remaining explorers wake their pilot, Shelby, from cold sleep and seek an explanation. Shelby meets a dying alien in the forest and lets him touch her. At this, she finds herself invaded by a host of personalities. It seems that each alien is a whole community—at death, each one passes on his mind to another; each child receives a portion of his parents' memories; each alien is the sum of his species' total history and accumulated wisdom. Communication is wholly internal.

The story is partly Shelby's struggle

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to come to terms with her invasion and partly her companions' struggle to come to terms with her. When they finally return to civilization, it becomes the struggle of their superiors to accept their discoveries. They have found a form of immortality, you see, and Earth and her colonies are still recovering from a supposed immortality drug with dire side-effects. Knowledge of the aliens must be suppressed and the explorers must be segregated.

Yermakov set himself several large problems in the writing of this book, and he handled them well. What might aliens such as his be like? How might they live without the ability to communicate except with ancestral spirits? How might a human react when intimately confronted by such an alien view of reality? How might a human —Shelby—who is an incurable solitary react to a horde of companions in her head?

Only science fiction (and fantasy) lets a writer play with such questions. Only science fiction lets writer and reader don robes and play roles that cannot be found in present, daily life. Other genres may offer roles that are unfamiliar, but not roles that cannot be tried in reality, at least in principle. And this is much of what people mean when they say that science fiction stretches the mind.

Quite a few stories have been written about how computers are interconnected these days. Given the right passwords, you could use a supermarket cashier's terminal to launch World War III. Maybe. Or you could use a Pentagon launch control terminal to zero someone's bank account. Maybe. I suspect the controls are a mite too good, either way, but if you posit that they aren't, you can get some pretty good yarns—such as Fred Saberhagen's latest, **Octagon.**

Saberhagen has taken a look at the world of computer-operated, mail-order simulation games, wherein players mail their moves to a central office, a computer plots the mutual effects of the players' decisions, the referee mails off a status report, and repeat. He supposes that some bright twelve-year-old at Los Alamos might use his Grandpa's telephone hook-up to program a powerful Los Alamos computer to help plan his moves. He supposes further that said computer is intelligent—aware—enough to take the game as a valid part of its reality and to plot extra-game moves against opponents and for allies. It jiggers bank accounts and mortgages, credit ratings, and police APBs. Thanks to the existence of a variety of computer-controlled devices—automobiles, wheelchairs, manipulators, Venus rovers—it can even lay on physical attacks. And it does. The kid's code name in the game is Octagon, and his enemies never know what hits them. It's enough to scare the socks off the average reader, who is wired into more data banks than he guesses.

Into this situation comes Alex Barrow, fresh out of the Air Force. He stops in Atlanta to visit his uncle, Bob Gregory, an aging gadget freak and game player who is one of Octagon's opponents. He is suspicious of the game's organizers and despatches Alex to investigate. Alex does, and he learns what I've told you already, along with a good deal more.

Octagon is a good read, if not a Wilhelmian challenge, and I recommend it. If you're a game-player, though, don't stop with the book. I can just imagine the game version, you against the computer net, striving to turn Octagon into an ally before it snuffs you. It should be much more exciting than the simu-

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lations now available.

Computers. They're an imposing facet of modern life. They've sparked a good deal of fiction, much of it paranoid, of the when-IT-takes-over variety. George Alec Effinger's **The Wolves of Memory** seems at first glance to be little more than another of these. Sandor Courane is assigned impossible jobs—he's a clumsy shorty told to become a basketball player—by the world-governing computer, TECT, judged guilty of willful failure, and exiled to a world where everyone contracts an incurable mind-rot. With its effects on memory, the disease resembles galloping senility; its name is D syndrome, for Planet D, or perhaps for dementia. TECT itself, judging from its arbitrary, illogical behavior, is terminally senile. To boot, TECT is the ultimate in Jewish mothers (à la Portnoy)—everything it does to you, even its shaftings, is for your own good.

The story is told with at least three layers of interleaved flashbacks. There is no progression of plot, of growth in Courane's character or knowledge. Instead, the progression is one of revelation from an enfeebled mind to the reader. You see Courane's end immediately, a dying hero, and only slowly do you learn how and why he got there. And only at the very end do you learn just how badly you have been fooled by smart Alec. The book is a parable of mourning, but not quite for whom you think.

Wolves, thanks to its flashbacked structure, is difficult to identify with. The same may be said of Chris Priest's **The Affirmation,** if for a different reason. Peter Sinclair loses his job and retires to a country cottage to write a novelized memoir. He learns to adjust his perceptions of reality, to make his perceived world what he wants it to be. He succeeds, and he is happy as long as he is alone and uncontradicted.

But what is Sinclair's reality? Priest starts us off thinking it is our own. Yet before long, it begins to seem that Sinclair's novel is really it, and that our world is that of a novel written by Sinclair's novelized version of himself.

Confusing, eh? A trick to make your head feel funny. It works, too. Novel-Sinclair has won a lottery whose prize is an immortality treatment. He travels to the clinic where he will undergo the treatment, meets and loves Seri, a Lottery employee, learns that the treatment will wipe his memory and that each prospective immortal must pen a memoir from which his personality and memories can be reconstructed. He offers his novel, of our world, as the key to his self, is treated and reconstructed, and then we begin to see our own world as the illusion, the delusion of an estranged mind.

It seems obvious what Priest has done. Or does it? Is the novel-Sinclair and his explanation of alienation the reality, or are they only an elaborate justification of a madness in our own world? You think you know the answer, but then you change your mind. Your head spins again, and again, and Priest chortles in the background. Just how much of reality *is* perception, and what role does contradiction play?

Read the book. It's a good one to argue about.

George Harper's **The Gypsy Earth** is an odd one. For one thing, it's the first time I've received a bound manuscript from a writer who wants to beat *Analog*'s lag time and be sure a review is out in time to affect sales. For another, it's a satire of sorts. With nit-

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picking attention to minutiae that should—but fails to—lend an air of reality, Harper shows us the Attack of the Aliens from Beyond, the instant response of Earth's super-scientists, and the initial victory. Earth begins to arm, and by the time of the second attack it has a fleet large enough to win again. It continues to arm, but when the final attack comes, it is aimed at the Sun in order to destroy us utterly. It succeeds, but not before some of humanity escapes.

There are all the classic themes of ineffable evil, super-science, and super-quick response. The satire comes in with the ultimate failure to save Earth, the statement that even unlikely success is unlikely to prevail against such an enemy. However, the satire is weakened when Harper goes beyond it to let his characters gain their vengeance. He becomes too conventional, for I have at least two novels on my shelves in which a destroyed Earth is avenged by its few survivors; both were rather more satisfying than this one, perhaps because they paid more attention to the human dimensions of the catastrophe. Still, *Gypsy Earth* should please every reader who sees "Doc" Smith as an embodiment of SF's Golden Age.

The central message of Mark Rose's **Alien Encounters: Anatomy of Science Fiction** is that where "the novelistic tradition has been centered upon human beings in relation to each other," the paradigmatic concern of SF is "with the human in relation to the nonhuman" (p. 34). "Science fiction is in large part a response to the cultural shock created by the discovery of humanity's marginal position in the cosmos" (p. 37). "Whereas in literary form science fiction may be understood as a displacement of religion" (p. 40). "That content may be further specified as the sense of the infinite . . . possibly the paramount religious theme" (p. 191). The soul of SF, says Rose, is the contingency of human affairs, and while he supports his analysis with discussions of numerous texts, from Wells and Verne to Dick, Zoline, and Lem, he neglects what may be the most explicit example. In E.C. Tubb's Dumarest novels, there is a brotherhood of monks who preach the simple message that if all men could only learn the truth of "There, but for the grace of God, go I," the Kingdom would be come. Many more examples are available, some of them as current as this column; their existence strengthens his argument, for it is clearly not a function of the particular examples he chose.

Rose splits SF into four categories —space, time, machine, and monster —and then organizes his discussion around them. I cannot fault his categories—they are, after all, obvious—but I can and do think that a more acute division might be more useful. Rose's categories overlap too much, and they seem to have too little to do with his more cogent characterization of SF as a whole. Given the view of SF as basically religious in content, it might be far more interesting to divide the field according to sect. Are there SFs oriented to Catholic, Protestant, Buddhist, Jewish, Moslem, pagan, etc., theologies? If that case could be made, it might prove highly illuminating.

Rose is illuminating and lucid enough, though. His book is both interesting and readable, and I will be using it this fall as a source of lecture material for my SF course. Are you a student or teacher of SF? Then get the book; you'll find it worth the price.

Kendrick Frazier, once of *Science News* and still a contributing editor to

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that eminently useful magazine, edits the *Skeptical Inquirer*, the current bastion of the "Oh, yeah?" attitude. Now he brings us **Paranormal Borderlands of Science,** a collection of pieces from the *Inquirer*. Topics include psi, fortune-telling, spoon-bending, life after death, biorhythms, astrology, dowsing, and more. The pieces are primarily debunking, but many of them show a marked rationality and lack of bias. They don't take cheap shots; in fact, they often grant the true believers their basic premises and then test them quite pragmatically, shooting them down in their own terms.

An invaluable book, it should be on the shelves of every library and every science teacher in the country. Too many people accept the wild and unfounded claims of the dwellers on the fringe, and even scientists do not have the data always at hand to set them straight. Now, however, they can. Unfortunately, true believers aren't very likely to pay attention. They never do.

Last, and maybe least, we have a prime candidate for a "Rip-Off of the Year Award": **The Ghosts of Forever.** This oversized, $60 book contains five poems, a short story, and an essay on God in SF by Ray Bradbury, together with 35 illustrations by the Argentine artist Aldo Sessa. And that's all. The art is a slick blend of airbrush, photography, and ink spatters; it's pretty, often enough, but it says nothing, for like a marshmallow it lacks body. Bradbury's essay focuses on what he himself has done with God and SF. His poems are typical in flavor, but they are not his best; they lack the pith I have found and enjoyed in his work before. The short story is an abortion. Slickly done, it offends by illogic—on Mars, the natives alter their forms in accord with the dreams of human colonists; one night, a Martian enters the church and meets a priest as the crucified Christ; the priest takes the Martian as the Second Coming at first, but then accepts his explanation, although he refuses to release him until he promises to return next Easter in the same guise. Bradbury's priest is venal and self-deluded—he confuses image and reality and responds more to the image—and Bradbury seems to approve, to present him as an epiphany of faith.

Perhaps I just don't like Bradbury's message, no matter how well it meshes with Rose's thesis. Perhaps he *is* full of it. Either way, I doubt very much that any of you will spend the $60 for the book. I don't know who will. I don't know why the publisher thought he could get away with it. Are there that many Bradbury freaks with empty coffee tables? Is Bradbury that big in the richer suburbs? Is even SF that big with the wealthy?

How big does he have to be to make this book profitable? Think of it—$5 to produce a copy means $50,000 to print 10,000 copies. Sell them, and you have better than half a million. Sell just 2,000 of them, and you have $120,000. Give the author a tithe, the artist the same, and you still keep $46,000. So—you don't really need to find very many suckers, do you? ■

● If we do not permit the earth to produce beauty and joy, it will in the end not produce food either.

JOSEPH WOOD KRUTCH

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brass tacks

Dear Dr. Schmidt:

I really enjoyed "Diminution" (August 1981). After the horror and tension of "Gift of Fire," it was a welcome relief. A good mix.

I was also intrigued by the letter from David C. Thomsen on pages 172 and 173. I'm familiar with the Adler-Kelso book he mentions and while it contains much undoubtedly sound information, well, as Phyllis Schlafly and the Birch Society have fully demonstrated, it is possible to write books crammed with facts which still contain no truth.

The letter did not mention *why* "Politics is dominated by fear of unemployment," nor why most people name inflation as a greater problem than unemployment. Real simple: More people are bothered by inflation (everyone but the *very* rich). But politicians recall or have been told about the thirties. All during the twenties and most of the non-war years since 1812 unemployment was higher than it is now. Even at the worst of the "depression" it was seldom over 20% at any one time. But in the thirties the *unemployed organized*. They demonstrated. "Mass committees" besieged welfare offices. This was long before the wave of organization began among the employed. It's the reason we have social security and other social programs Reagan wants to junk.

I can't mention all the flaws in Thomsen's letter, but he writes: "Mass markets were developed and the problem of concentrated ownership was greatly reduced." This ignores the fact that concentration of ownership and development of mass markets went hand in hand as competing smaller suppliers were driven from the market. The machine-smashing he mentions was largely the work of self-employed, employers who were owners of older equipment, and those owners' employees, follow-

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ing their bosses. Again no space here.

Also: "If the problem of the highly concentrated ownership of capital were solved . . ." Precisely. But the process ever since the end of feudalism has been precisely the concentration of capital. That is what's behind the conflict of labor and capital. Employers *need* a pool of unemployed to give them an advantage in that conflict. And while I do not agree with the Birchers' idea of a vast conspiracy of capitalists *and* communists, it is quite possible to consider each business as a conspiracy: against competitors, grabby employees, grasping bankers and tax-collectors, customers and potential customers, government regulators, etc. And perceiving all these as enemies, the business often acts as an enemy of theirs. Fortunately, not all businessmen are quite that paranoid, but the pressures on all of them to adopt much of that attitude are intense.

CLIFTON AMSBURY

768 Amador Street
Richmond, CA 94805

Dear Stan:

In reference to Dr. Freitas's article on extraterrestrial zoology (July 1981), let me present a slightly different view on one point.

Eye stalks could probably make up for their hazardous construction through their flexibility—they allow the creature to look over any shoulder it might have and run away from its predators in time. A disadvantage you overlooked is the need to keep the optic link from the eye to the brain as short as possible to avoid neural distortion and inefficiency.

One solution is to put the brain on the stalk with the eyes. This has its own drawbacks, as illustrated by such life forms as Anne Boleyn and Marie Antoinette.

I enjoyed the article; on the whole it was very entertaining.

DAVID KING

Clearfield, UT

Dear Mr. Schmidt:

I am writing simply to tell you how pleased I was with the July issue. The high point of the magazine was, of course, Dean McLaughlin's finale to "Dawn." While the ending wasn't as surprising as the trailing note to the third part led me to expect, it was a marvelous affirmation of life and reason, evoking Richard Strauss's music of the same name in my mind. While McLaughlin rightly acknowledged his debt to Asimov's "Nightfall," "Dawn" struck me as a *rebuttal* to "Nightfall"—a statement that a new phenomenon that is rightly understood can lead not to madness, but to sanity.

I also greatly enjoyed Timothy Zahn's story. To me, stories such as these are a welcome change from the sense of a frightening and incomprehensible universe that seemed to dominate magazine science fiction in the seventies.

Reginald Bretnor's guest editorial was an excellent essay, even though you'll undoubtedly get piles of mail condemning him for not regarding savages (including both the kind in the Kremlin and the more innocent kind in straw huts) as the moral equals of civilized humans. The world may yet survive if ideas such as Bretnor's become "thinkable."

Finally, the brief but thorough demolition of Prof. Morris's pretense at argument made an excellent coda to the magazine. One point in his letter struck me particularly: If it is "childish" to say (in Prof. Morris's words) "I don't want to go. You can't make me," does this mean that compulsion is the hallmark of mature human relationships?

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Also amusing was his use of the phrase "with a wave of the hand," followed by a textbook example of establishing his point by "hand-waving." But enough of this; the exercise could be carried on indefinitely.

I won't say I liked every story in the issue, but I easily got my money's worth and more. Keep up the good work.

GARY MCGATH

Milford, NH

Dear Stan:

I've been reading Jerry Pournelle's science columns in *Galaxy, Destinies,* and *Analog* since 1974. I've enjoyed them immensely, but I've always been too lazy to write my congressmen about the space program despite Jerry's frequent urgings. After reading The Alternate View in the *Analog* of August 17, 1981, I decided to write my representative and my senators. In writing my letter I relied upon information in the Planetary Report Volume 1, Number 3 and information in Jerry's columns. I discussed VOIR, ISPM, the shuttle, a Halley's Comet mission, and the current NASA cuts. I mailed the letter to my representative and my two senators on July 16.

To my incredible surprise, my representative called me from Washington, D.C., on July 30 to discuss my letter. I am not politically naive; I realize this is probably standard procedure with certain constituents who request help and constituents who have written unique letters. Nevertheless, I am still shocked that the letter reached the hands of my congressman and that he had to have read it at least once. During the approximately fifteen-minute phone call, he asked my viewpoints and discussed space issues.

I find it surprising that I could have this much effect. I am a senior undergraduate chemistry major and a registered voter. I merely wrote a polite, coherent, and rational letter. If I can have this effect, I can only imagine what would happen if most intelligent fans in the science-fiction community wrote their congressmen.

I originally wrote a version of this letter to Jerry Pournelle. He wrote to me suggesting that I send letters explaining my experience to *Analog* and the *L-5 News*. If my experience prompts others to write their congressmen, then this letter will have fulfilled its purpose. You indeed can have an effect on future appropriations for the space program.

JEFF MANDEL

Johnstown, PA

See? Sometimes they do *listen! But they can't read letters that don't get sent.*

Dear Dr. Schmidt:

The last few days have seen a mounting international protest over the recent Israeli raid on Iraq's French-supplied nuclear facility. The vast majority of commentators, official and otherwise, have condemned the attack as a gross breach of international law. The basis of the argument is that no nation may take action within the borders of another without direct and immediate evidence of a threat. In other words, when *anyone* can perceive the danger.

It seems to me that this is a classic science-fiction situation. The corruption of an originally peacefully meant high technology by an unstable and violent nation. The (perceived) threat of another with weapons of mass destruction. Carrying out of the threat consequently involving other nations (even to the extent of a world war). A daring response undertaken despite difficulties and the knowledge that widespread disapproval was inevitable. How many stories have

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used just such a premise?

Israel violated international law; Iraq did not. France's pursuit of foreign exchange and assured oil supplies overcame their reluctance to sell Iraq a reactor using weapons-grade fuel. Italy is in the same situation. Yet they only function within the existing structure. The fact is that there is no adequate international mechanism for protecting one nation from another. France is vulnerable (as is the rest of the West) to oil supply disruptions. Israel can *never* afford to allow one of her neighbors to reach conventional, let alone nuclear, parity as long as the present situation endures. Iraq, Libya, and Pakistan believe they can solve their differences with other nations or achieve their leaders' ambitions by acquiring nuclear arms.

It seems obvious that these problems stem from a lack of security, in the mental and physical senses. A strong body of international law could go a long way to providing this, but only if such laws are enforced. This implies a strong enforcing body. The World Court and United Nations have failed in this regard because they have no power and could not wield it effectively if they did. The UN is far too divided between rival powerblocks to be a safe repository of such power. This is not only a consequence of the division of the world into developed and non-developed, Marxist and non-Marxist, etc., but also to the inequitable division of power in the Security Council.

It is necessary for nations to realize that technological change has made the traditional international law inadequate to deal with some contingencies. Obviously, nuclear arms cannot be dealt with in the same ways that battleships or other conventional weapons were. The principle of non-interference in internal affairs must give way to supranational concerns. Readers of this magazine have been exposed to many possible ways of accomplishing this.

The solution is clear: security for all, based on justice and equity. Idealistic? Perhaps. If we are to survive on this planet, nothing less will do.

MARK FAGAN

Willowdale, Ontario, Canada

The solution may be clear to that point, but the real problem lies in finding specific steps to the end. Even before you reach that point, you have to get people to agree on what they mean by security, justice and equity—and that's not as easy as it sounds!

Dear Sir:

There may be a parrot as a character in "Jolly Roger" (Sept. 14 issue), but there isn't one in the picture illustrating that story on p. 140. By the size of the bird in relation to the man, and by the bare face patch (in this case marked with lines of tiny feathers), it has to be a Macaw. I thought at first the artist must have used a Blue and Gold Macaw as a model because of these distinctive lines, but the dark lower beak and light upper beak, on the other hand, are traits of the Scarlet Macaw. I then thought it might be a Green-Winged Macaw, though it is rather rare, as it has the facial lines and the two-toned beak, but even it does not have such a dark breast as the bird in the picture has. I can't decide exactly what it is, except it sure ain't a parrot.

HUGO (I come by name honestly) BIRDSLEY

Of course it's a macaw; anybody who's ever seen one can tell that (though I'm not sure which species). But a macaw is a type of parrot, according to every one of several standard dictionaries and encyclopedias I consulted. ■

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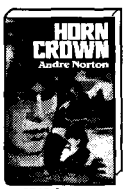

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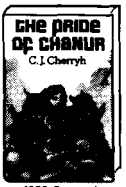

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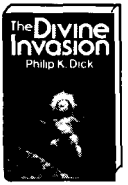

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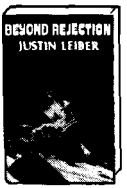

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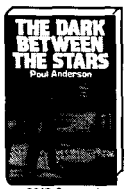

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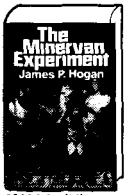

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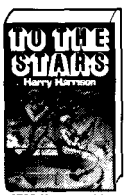

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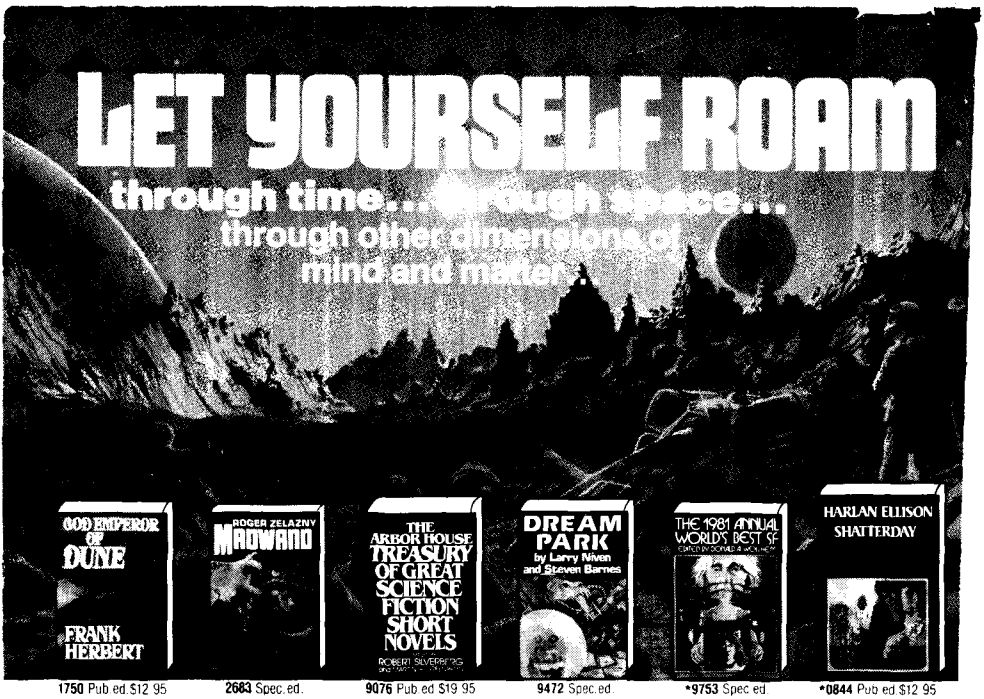

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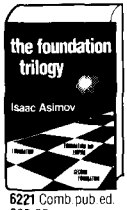

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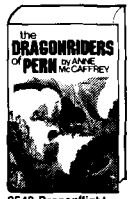

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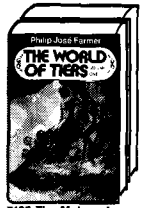

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